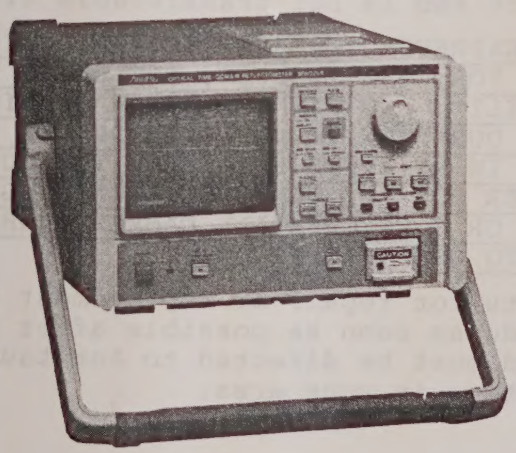
G-3

Anritsu

SERVICE MANUAL

OPTICAL TIME DOMAIN REFLECTOMETER

MW920A



Applicable Serial Nos.
start from MT48678
1991.07 Ver. III
Printed in Japan
1992.03 x 70 N(IV)-6(Y)

CERTIFICATION

ANRITSU CORPORATION certifies that this instrument has been thoroughly tested and inspected, and found to meet published specifications prior to shipping.
Anritsu further certifies that its calibration measurements are based on the Japanese Electrotechnical Laboratory and Radio Research Laboratory standards.

WARRANTY

All parts of this product are warranted by Anritsu Corporation of Japan against defects in material or workmanship for a period of one year from the date of delivery. In the event of a defect occurring during the warranty period, Anritsu Corporation will repair or replace this product within a reasonable period of time after notification, free-of-charge, provided that: it is returned to Anritsu; has not been misused; has not been damaged by an act of God; and that the user has followed the instructions in the operation manual.

Any unauthorized modification, repair, or attempt to repair, will render this warranty void.

This warranty is effective only for the original purchaser of this product and is not transferable if it is resold.

ALL OTHER EXPRESSED WARRANTIES ARE DISCLAIMED AND ALL IMPLIED WARRANTIES FOR THIS PRODUCT, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO A PERIOD OF ONE YEAR FROM THE DATE OF DELIVERY. IN NO EVENT SHALL ANRITSU CORPORATION BE LIABLE TO THE CUSTOMER FOR ANY DAMAGES, INCLUDING LOST PROFITS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, ARISING OUT OF THE USE OR INABILITY TO USE THIS PRODUCT.

All requests for repair or replacement under this warranty must be made as soon as possible after the defect has been noticed and must be directed to Anritsu Corporation or its representative in your area.

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WARNING

NO OPERATOR SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED PERSONNEL.

CAUTION

FOR CONTINUED FIRE PROTECTION REPLACE
ONLY WITH SPECIFIED TYPE AND RATED FUSE.

Note:

WARNINGs, CAUTIONs, Notes, and Explanatory footnotes are used in this manual. Their meanings are given below:

WARNING: WARNING is used when there is a personal injury hazard.

CAUTION: CAUTION is used when the equipment may be damaged.

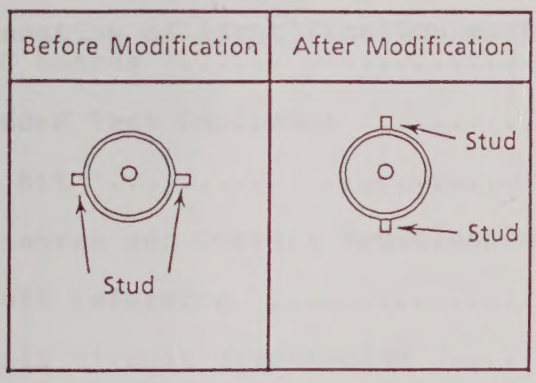
Note: Note is used to provide information about exceptions, corrections, and restrictions.

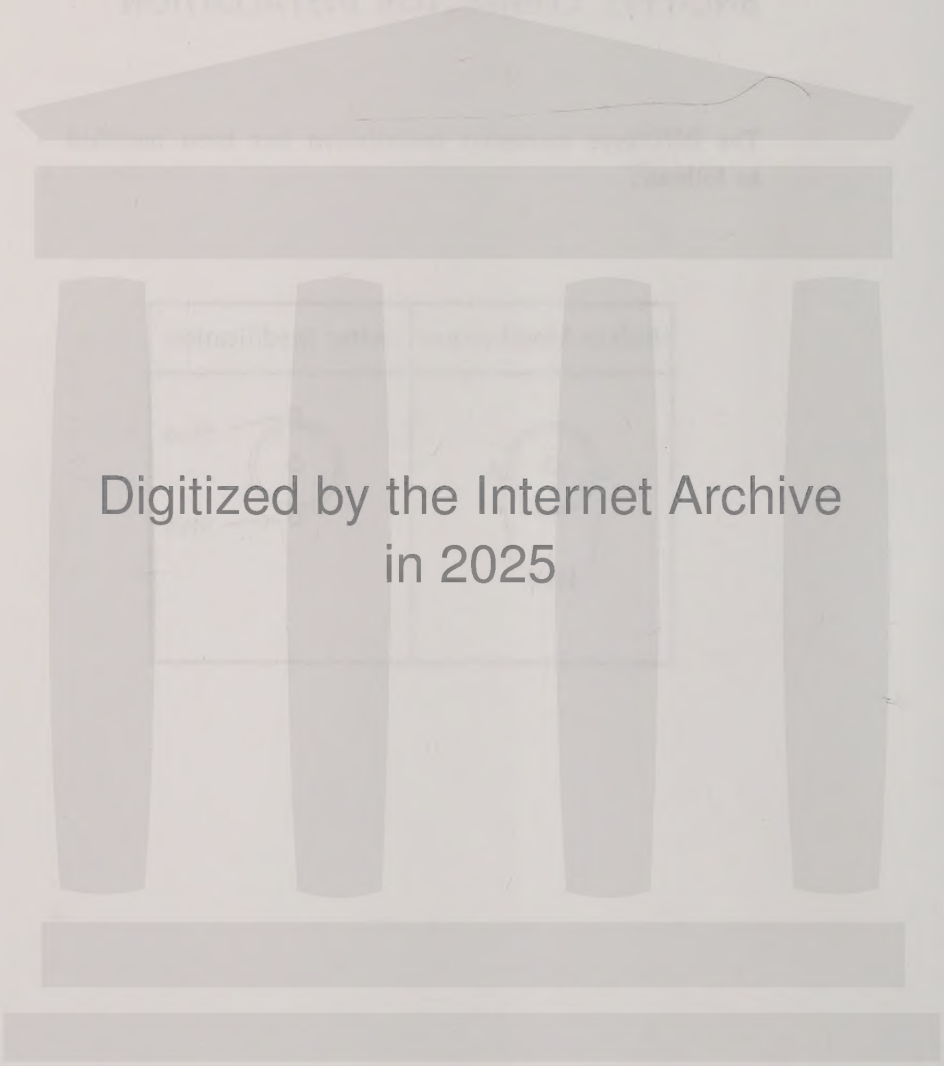
Explanatory footnote:

Explanatory footnotes provide comments on the same page as the text, figure or table. They are referenced by either an asterisk (*) or by combination of an asterisk and numeral.

BNC-TYPE CONNECTOR INSTALLATION

The BNC-type connector installation has been modified as follows:





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SECTION 1

GENERAL

This manual describes how to troubleshoot, repair, and adjust the MW920A Optical Time Domain Reflectometer.

To troubleshoot and repair the MH951A/MH952A/MH958A/MH968A Plug-in Units, see their separate service manual.

SECTION 2 describes how to assemble and disassemble the cabinet, and the internal configuration.

SECTION 3 describes how to troubleshoot and repair when trouble occurs during measurements or when abnormalities are detected during performance check.

SECTION 4 describes how to adjust the MW920A after the repair.

SECTION 5 describes the parts list and how to order replacement parts.

Refer to the separate operation manual for details of operating procedures.

SECTION 2

MECHANICAL CONFIGURATION

Table 2-1 shows the mechanical parts list. Figures 2-1 to 2-10 show disassembled views of the MW920A.

CAUTION

Execute the following steps before disassembly and assembly.

- Turn off the POWER switch on the front panel.
- Remove the power supply cord from the ac outlet.
- The unit labelled "DANGER" may possibly have high voltage still present after turning off and power.

  Never touch it before the discharge. Any interruption of the protective performance will cause a fire and electrical shock hazards that could result in personal injury.

Fig. 2-1 Top Cover and Bottom Cover Assembly

Fig. 2-2 Cabinet Assembly

Fig. 2-3 Front View

Fig. 2-4 Front Panel Assembly

Fig. 2-5 Rear Panel Assembly

Fig. 2-6 A2, A3, and A4 Assembly

Fig. 2-7 CRT Unit, A7, A8, and Z3 Assembly

Fig. 2-8 Printer Paper Assembly

Fig. 2-9 Printer Cover Assembly

Fig. 2-10 A1 and A10 Assembly

Table 2-1 Mechanical Parts List

Fig. No.	Part No.	Description	Remarks	Q'ty
2-2 (1)	W22B1075	Top Cover		1
2-2 (2)	W22B1076	Bottom Cover		1
2-2 (3)	W33Z4201	Card Case		1
2-2 (4)	W4B9735	Angle		1
2-2 (5)	W29E719	Carring Handle		1
2-2 (6)	W33E4239	Cord Winder		4
2-2 (7)	342E87811 (B)	Foot		4
2-2 (8)	W3Z2913 (A)	Operation guide	PREPARATION	1
2-2 (9)	W3Z2913 (B)	Operation guide	DISTANCE	1
2-2 (10)	W3Z1913 (C)	Operation guide	LOSS	1
2-2 (11)	W3Z2913 (D)	Operation guide	OTHER FUNCTIONS	1
2-3 (12)	44E79340	Button		3
2-3 (13)	W42N9199 (B)	Button		1
2-3 (14)	W42N9199 (C)	Button		1
2-3 (15)	44E80830	Button		4
2-3 (16)	442E80831	Button		5
2-3 (17)	W42N11592	Button		2
2-3 (18)	44E79340 (B)	Button		2
2-3 (19)	44E68583	Button		1

Table 2-1 Mechanical Parts List (Cont.)

Fig. No.	Part No.	Description	Remarks	Q'ty
2-4 (20)	W23B1072	Front Frame		1
2-4 (21)	W42E7179	Knob		1
2-4 (22)	W3E2608	Packing		1
2-4 (23)	34H39510 (B)	Prop		4
2-4 (24)	W4H7112	Corner Angle		4
2-4 (25)	W4H8996	Guide Prop		2
2-5 (26)	W4B8487	Angle		1
2-5 (27)	W4B8486	Angle		1
2-5 (28)	W23B899	Rear Panel		1
2-5 (29)	W4B8489	Angle		1
2-5 (30)	W4B11176	Angle		1
2-5 (31)	W4B11991	Cover		1
2-6 (32)	W4B8695	Bracket		1
2-6 (33)	33B5112 (BR)	Prop		5
2-7 (34)	W32B3473	Cover		1
2-7 (35)	34H39503 (F)	Prop		1
2-7 (36)	W4H11464	Prop		2

Table 2-1 Mechanical Parts List (Cont.)

Fig. No.	Part No.	Description	Remarks	Q'ty
2-8 (37)	34E73722	Knob		1
2-8 (38)	44E80830 (A)	Button		2
2-8 (39)	W4H6991	Shaft		1
2-9 (40)	W4H8563	Spring		2
2-9 (41)	W4H8562	Plate		2
2-9 (42)	W42H7119	Shaft		2
2-9 (43)	W29H948	Printer Cover		1
	W49H8907	Lever		1
2-9 (44)	W4B9514 (A)	Angle		1
2-9 (45)	W4B9514 (B)	Angle		1

Removing the Top and Bottom Covers (Fig. 2-1)

Step	Procedure
1	Remove the plug-in unit from the MW920A.
2	Remove the two screws (a) and remove the cord winder.
3	Pinch the printer cover lock knob, release the lock, and lift the cover.
4	Remove the four screws (b) and pull the top cover to the rear until it stops (about 8 mm), then lift the cover and remove it.
5	Pull the bottom cover to the rear and remove the cover.
6	Assemble in the opposite order of disassembly.

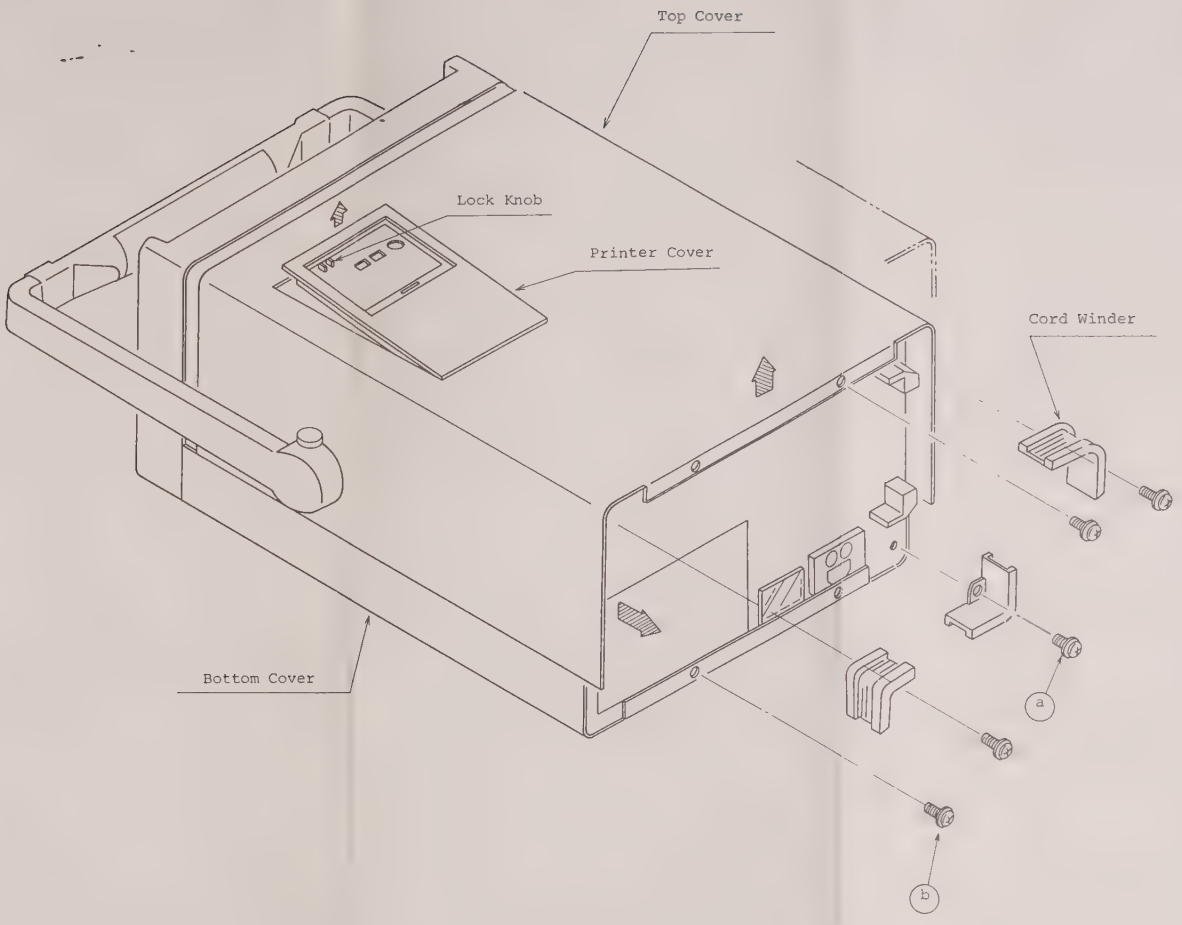


Fig. 2-1 Top Cover and Bottom Cover Assembly

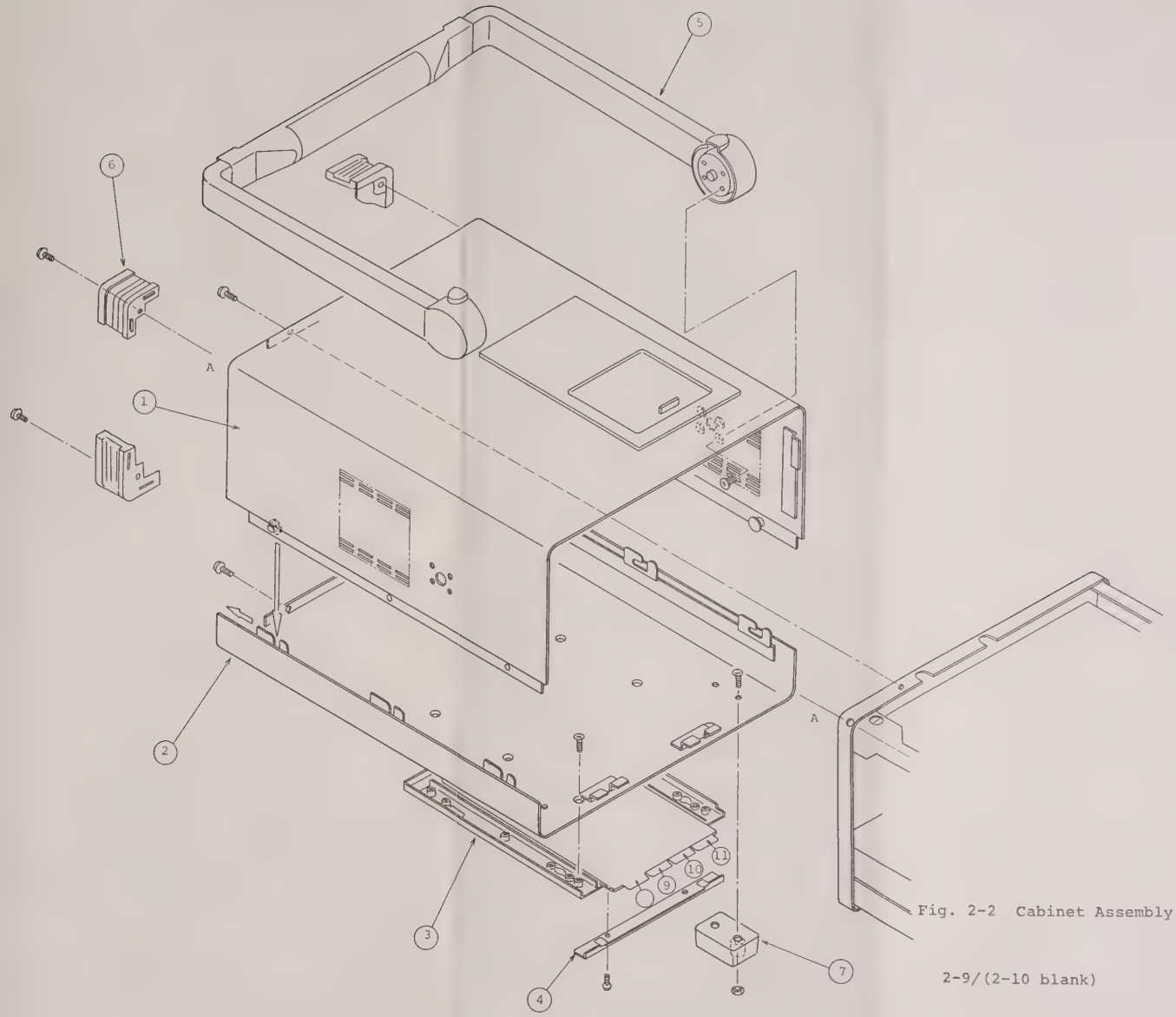


Fig. 2-2 Cabinet Assembly

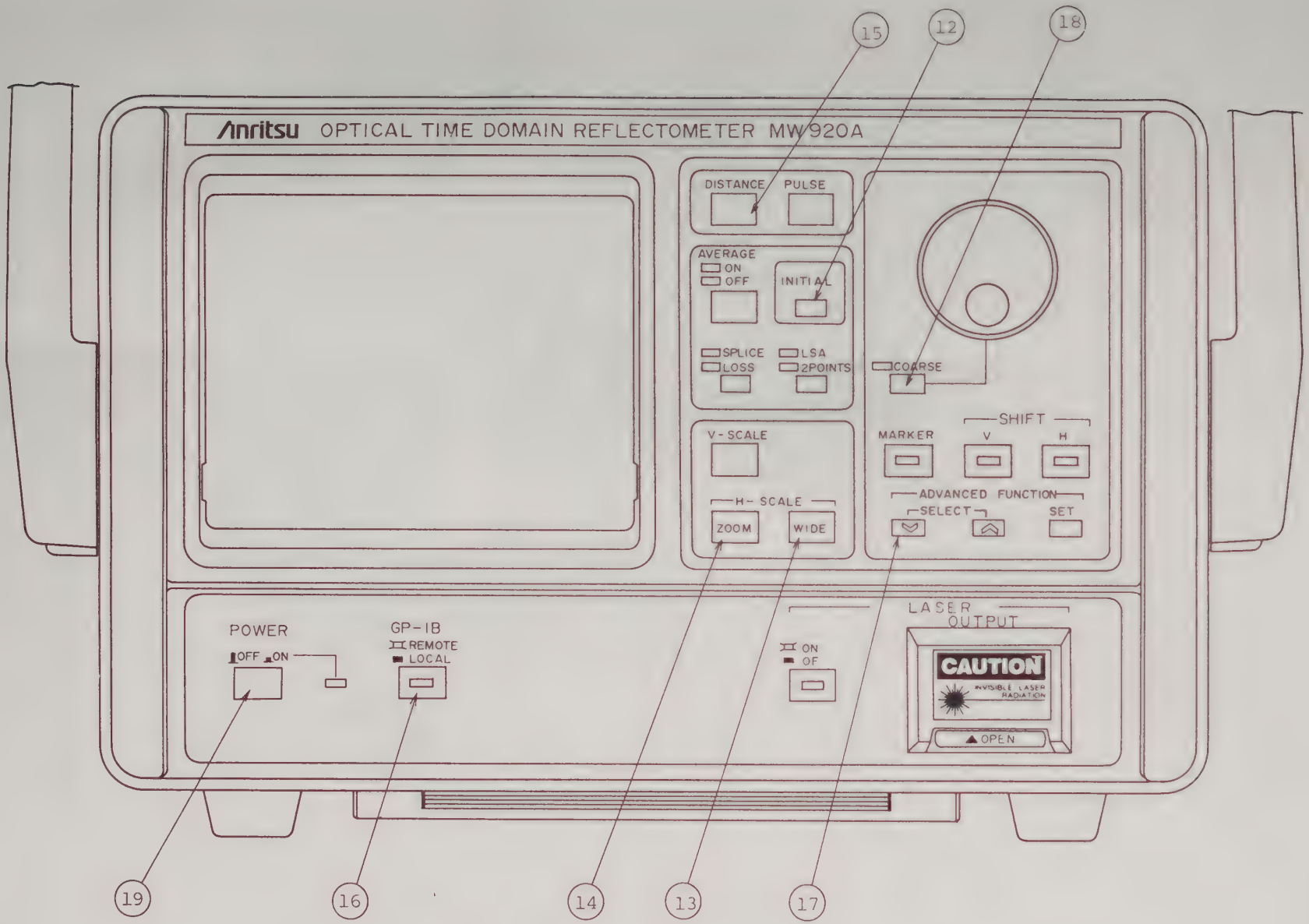
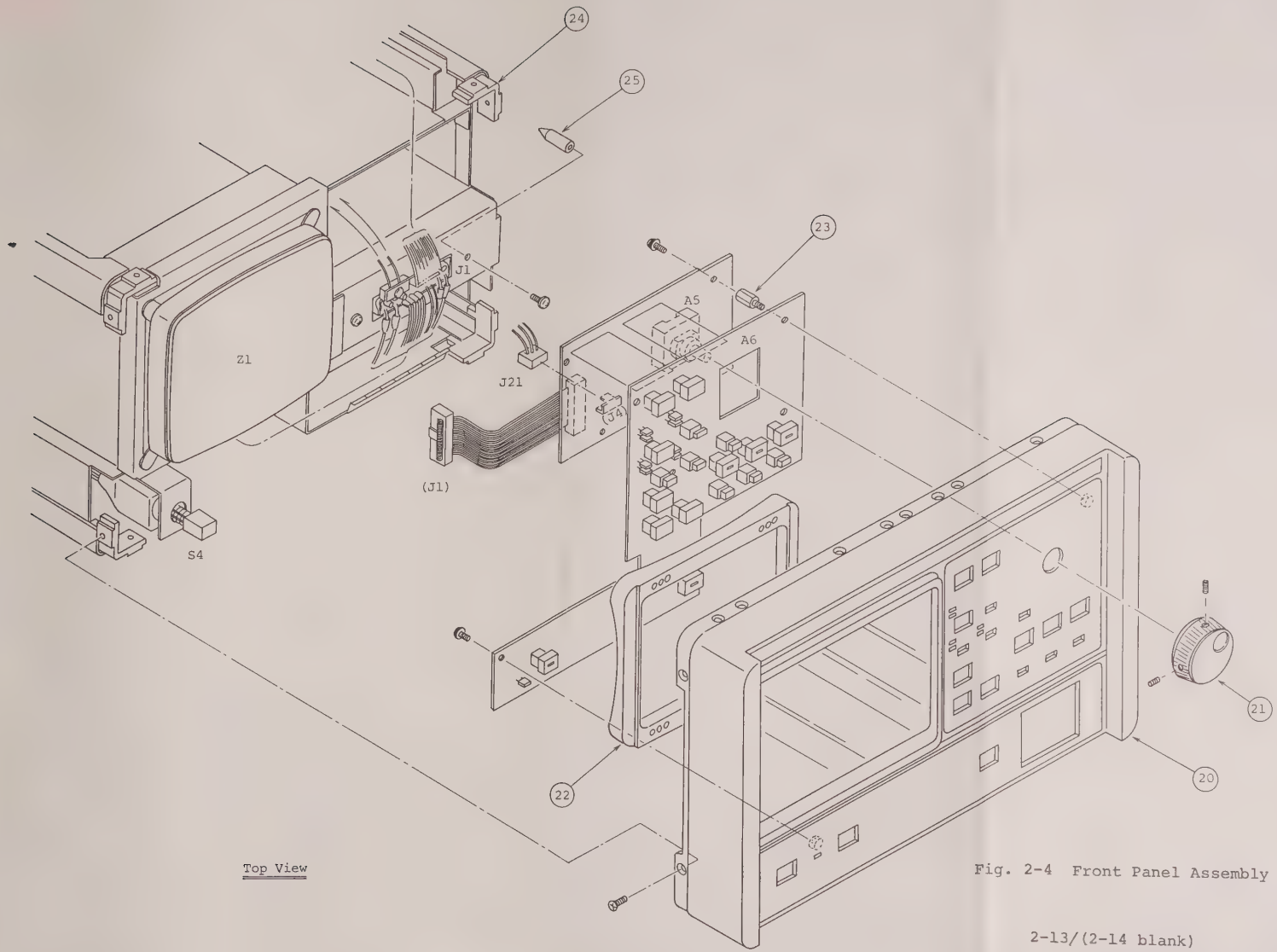


Fig. 2-3 Front View



Top View

Fig. 2-4 Front Panel Assembly

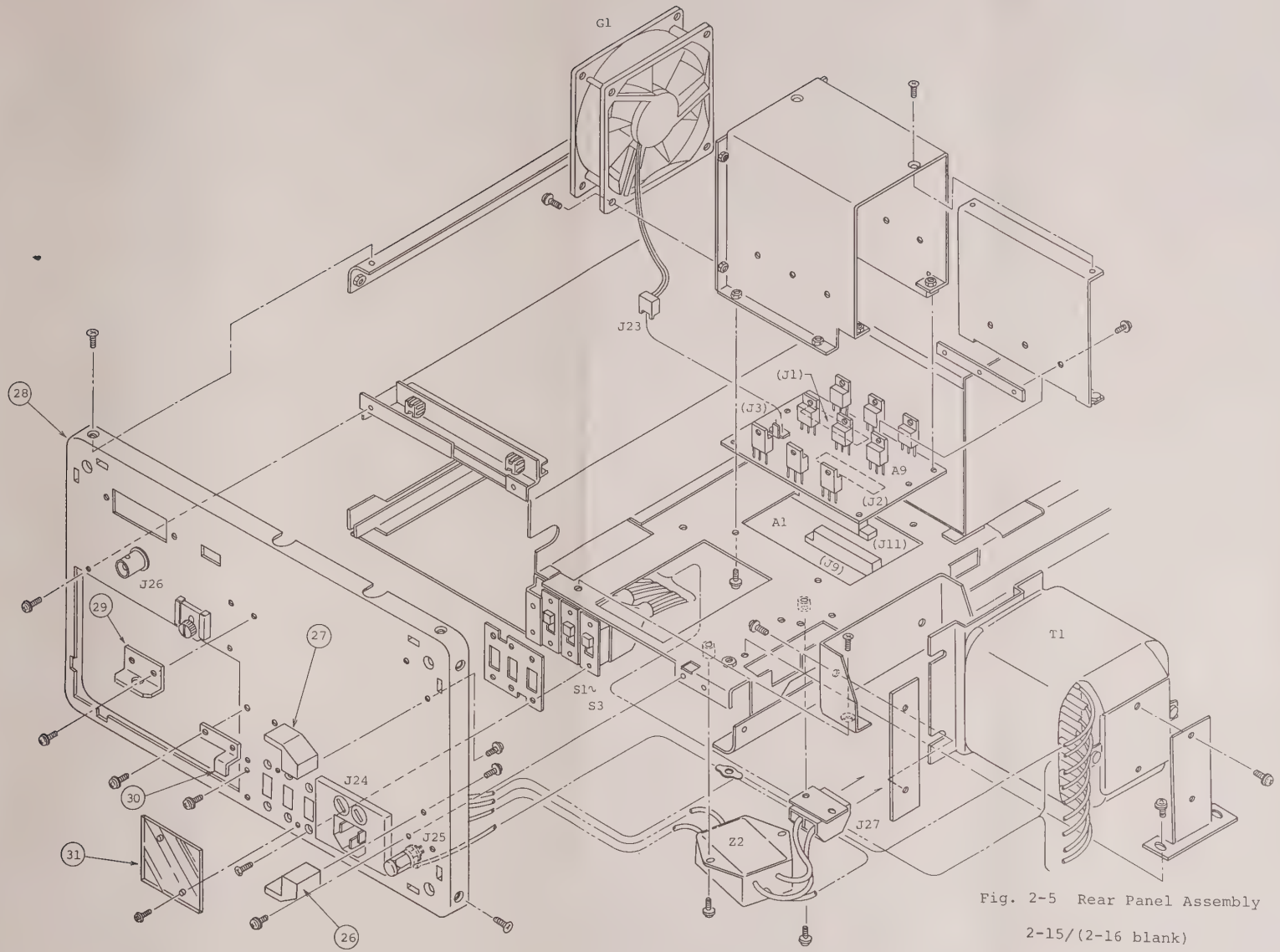


Fig. 2-5 Rear Panel Assembly

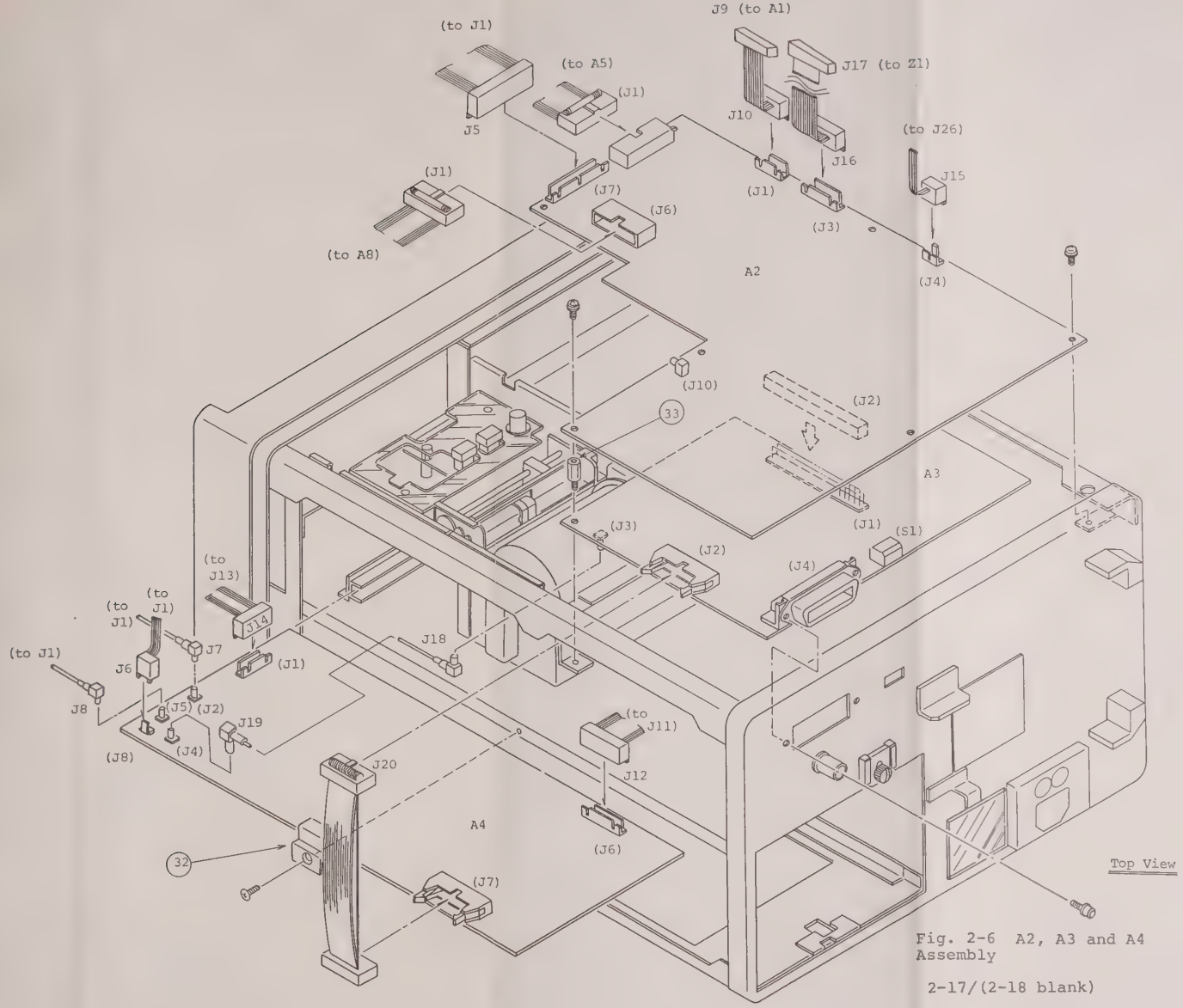


Fig. 2-6 A2, A3 and A4 Assembly

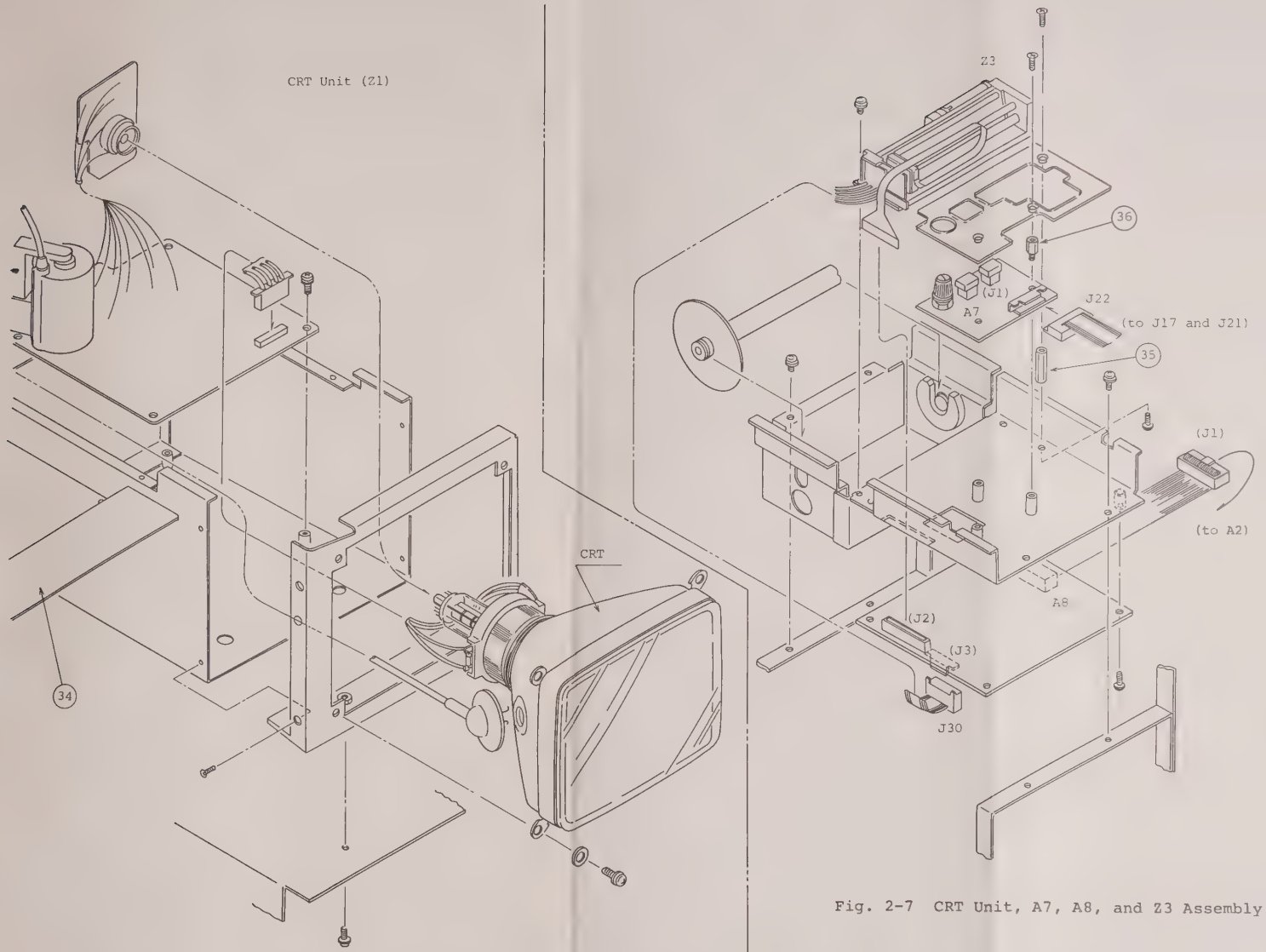
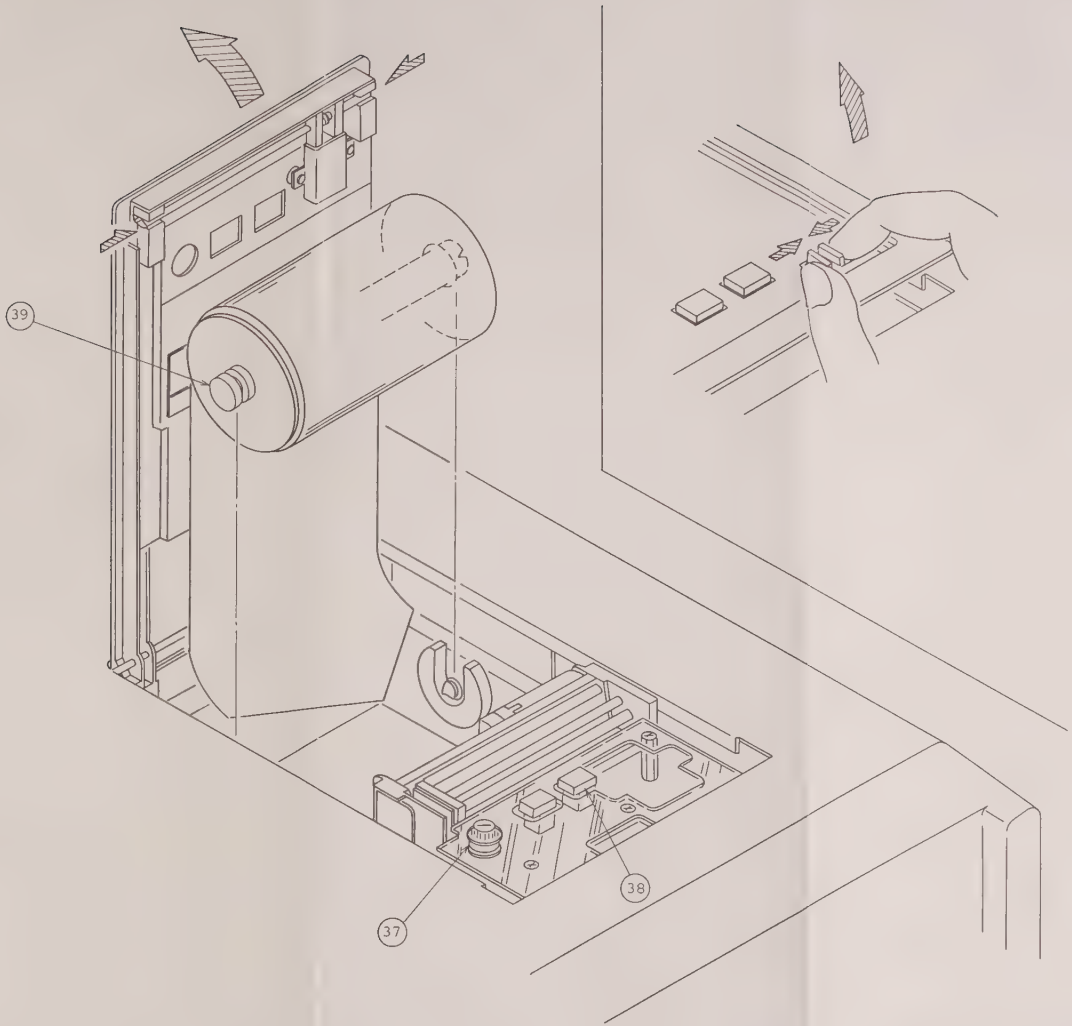
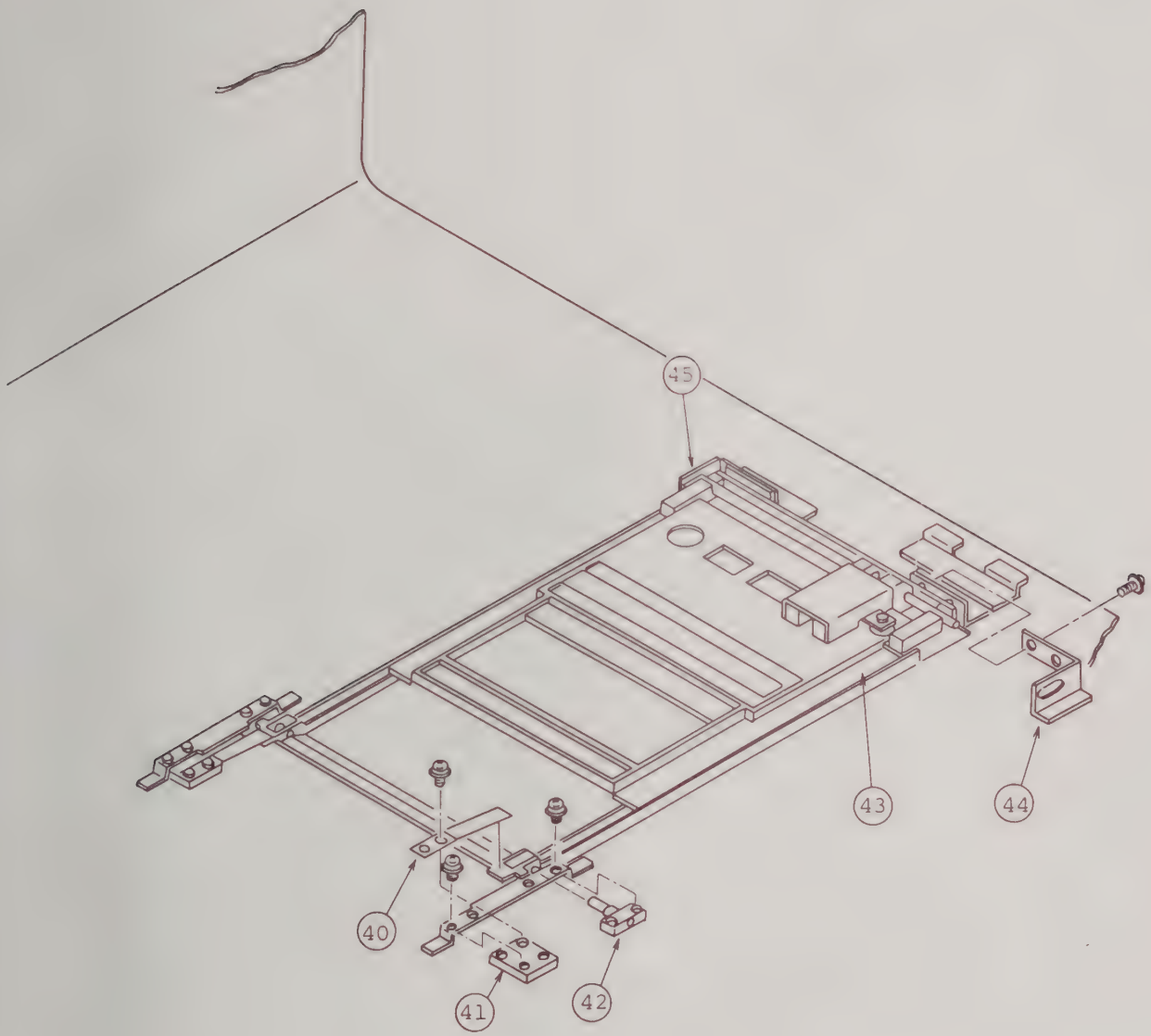


Fig. 2-7 CRT Unit, A7, A8, and Z3 Assembly



Top View

Fig. 2-8 Printer Paper Assembly



Bottom Side of Printer Access Cover View

Fig. 2-9 Printer Cover Assembly

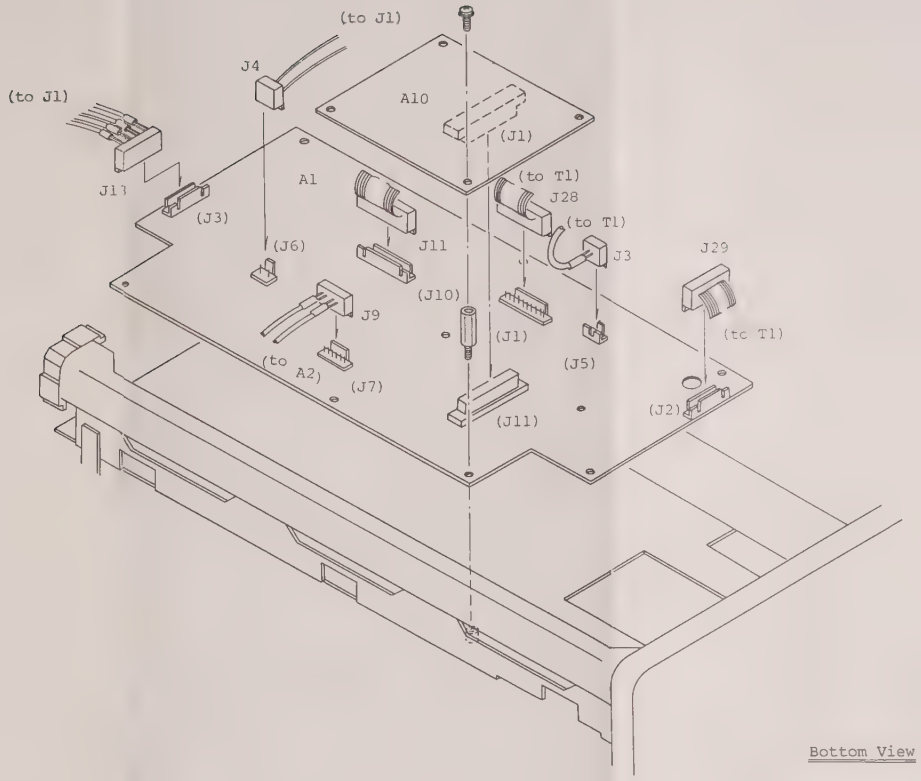


Fig. 2-10 A1 and A10 Assembly

SECTION 3

TROUBLESHOOTING AND REPAIR

SECTION 3 describes how to troubleshoot and repair the MW920A when problems occur during measurements or when abnormalities are detected during the performance test.

3.1 Safety Precautions

(1) To avoid accidental electric shock, the "⏚" terminal on the rear panel must be grounded.

(2) As a high-voltage for the cathode-ray tube is generated in this instrument, the cabinet must not be disassembled while the POWER is ON. The high voltage section displays the following label:

(3) Never touch the 96-contact connector for the plug-in unit or insert metal items into it while the power is on.

(4) The plug-in unit must be inserted and remove ONLY while the power is off.

(5) Make sure the line voltage agrees with the VOLTAGE SELECTOR switch settings on the rear panel.

(6) Never look directly at the laser beam emitted from the OUTPUT connector. The following label "CAUTION" is displayed on this part.

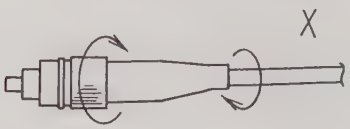
(7) Use of controls or adjustments of performance of procedures other than those specified herein may result in hazardous radiation exposure.

Notes:

Precautions on handling optical fiber cable and optical connectors

1. Do not pull the optical fiber cable too hard or bend it too sharply.

2. Do not twist the fiber cable where it is connected to the optical connector.

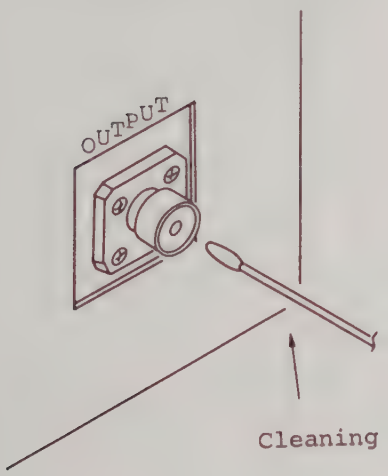


Notes (cont.)

3. Confirm that there is no dust or condensation on the optical adapter or plug. Be especially careful of the fiber terminal surface. Use caps and always keep the parts clean. An applicator moistened with alcohol should be used for cleaning.

4. If the fiber under test is connected to the OUTPUT connector and no trace is displayed on the CRT although the ON/OFF switch is on and the LED is on, it may be due to dust in the connector, or the fiber under test may be broken near the measured section.

   Clean the connector terminal surface or use another cable.



Cleaning with an applicator

Cleaning the terminal surface

3.2 Checking and Replacement of Parts

3.2.1 Explanation of identification markings on PC boards

As shown in Fig. 3-1, each MW920A PC board has an A number, PC board number with the revision number, PC board name, part numbers, and check point names.

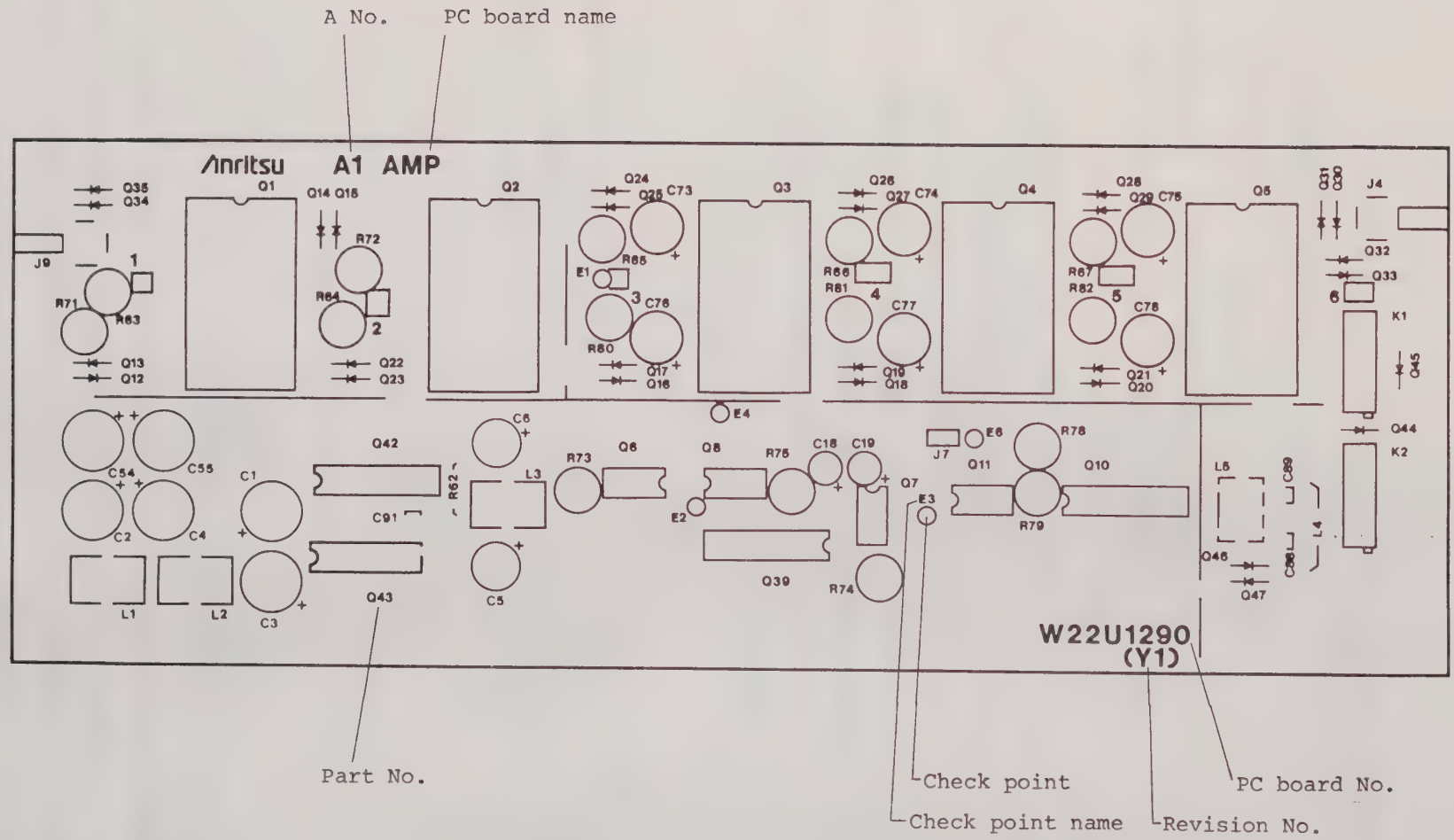


Fig. 3-1 PC Board Identification Marking

3.3 Recommended Test Equipment

Table 3-2 lists the recommended test equipment for troubleshooting.

Table 3-2 Recommended Test Equipment for Troubleshooting

No.	Equipment	Required Specifications	Remarks (Anritsu)
1	Digital multimeter	Measuring voltage range 0 to 300 V dc	
2	Oscilloscope	Frequency range Dc to 300 MHz	
3	Ohmmeter		
4	Frequency counter	10 Hz to 1000 MHz	MF63A

3.4 Service Kit

Table 3-3 lists the service kit for troubleshooting.

Table 3-3 Service Kit

No.	Name	Remarks
1	Extender cable 1 (W4W14164)	For connection between A2 and A3
2	Extender cable 2 (W4W14165)	For connection between A3 and A4
3	Extender cable 3 (W4W14166)	For connection between A3 and A4 (Coaxial cord)

3.5 Block Diagram and Overall Troubleshooting

3.5.1 Circuit reference

The MW920A PC boards have A numbers such as A1 and A2. Table 3-4 lists the circuit diagram numbers, circuit diagram names, A numbers, and PC board numbers.

Table 3-4 Circuit References

Circuit Diagram No.	Name	A No.	PC board No.
1	NW920A	-	-
2	POWER SUPPLY-1	A1	W22U1079
3	CPU	A2	W22U1081
4	ADD	A3	W32U4224
5	A/D	A4	W22U841
6	ENCODER	A5	W32U3597
7	KEY-1	A6	W32U3597
8	KEY-2	A7	W32U3597
9	PRINTER-IF	A8	W42U10789
10	POWER SUPPLY-3	A9	W42U10791
11	POWER SUPPLY-2	A10	W42U11066

Note:

For the parts list, see Table 5-1.

3.5.2 Overall circuit description

Figure 3-2 shows the MW920A block diagram.

The MW920A consists of ten PC boards: the A1 POWER SUPPLY-1, the A2 CPU, the A3 ADD, the A4 A/D, the A5 ENCODER, the A6 KEY-1, the A7 KEY-2, the A8 PRINTER IF, the A9 POWER SUPPLY-3, and A10 POWER SUPPLY-2.

The OEOUT signal output from the plug-in unit is input to the A4 A/D PC board and converted to a 6-bit digital signal by the A/D converter. This digital signal is input to the A3 ADD PC board, added by the addition circuit and extended to 16-bit data. A2 CPU receives this 16-bit data via the CPU bus, executes the data operation and displays the result on the CRT.

The ac output divided at the power transformer T1 is input to the A1 POWER SUPPLY-1 PC board. It is dc-regulated and then fed to each PC board as the dc power supply. The power supply consists of three PC boards. Rectifiers, fuses and smoothing circuits comprise the A1 POWER SUPPLY-1. The switching regulator circuit control unit is mounted on the POWER SUPPLY-2 PC board. Power transistors, which generate a large amount of heat, are also mounted on the POWER SUPPLY-3 PC board and it is located near the cooling fan.

The MW920A uses the 16-bit CPU 68000 controller. The CPU data and address buses are connected to the A5 ENCODER, A6 KEY-1, and A7 KEY-2 PC boards, which process the input at front panel key and rotary knob. The CPU data and address buses are also connected to the A8 PRINTER IF PC board which executes hard-copying at the built-in thermal printer.

3.5.3 Block diagram

Figure 3-2 shows the MW920A block diagram.

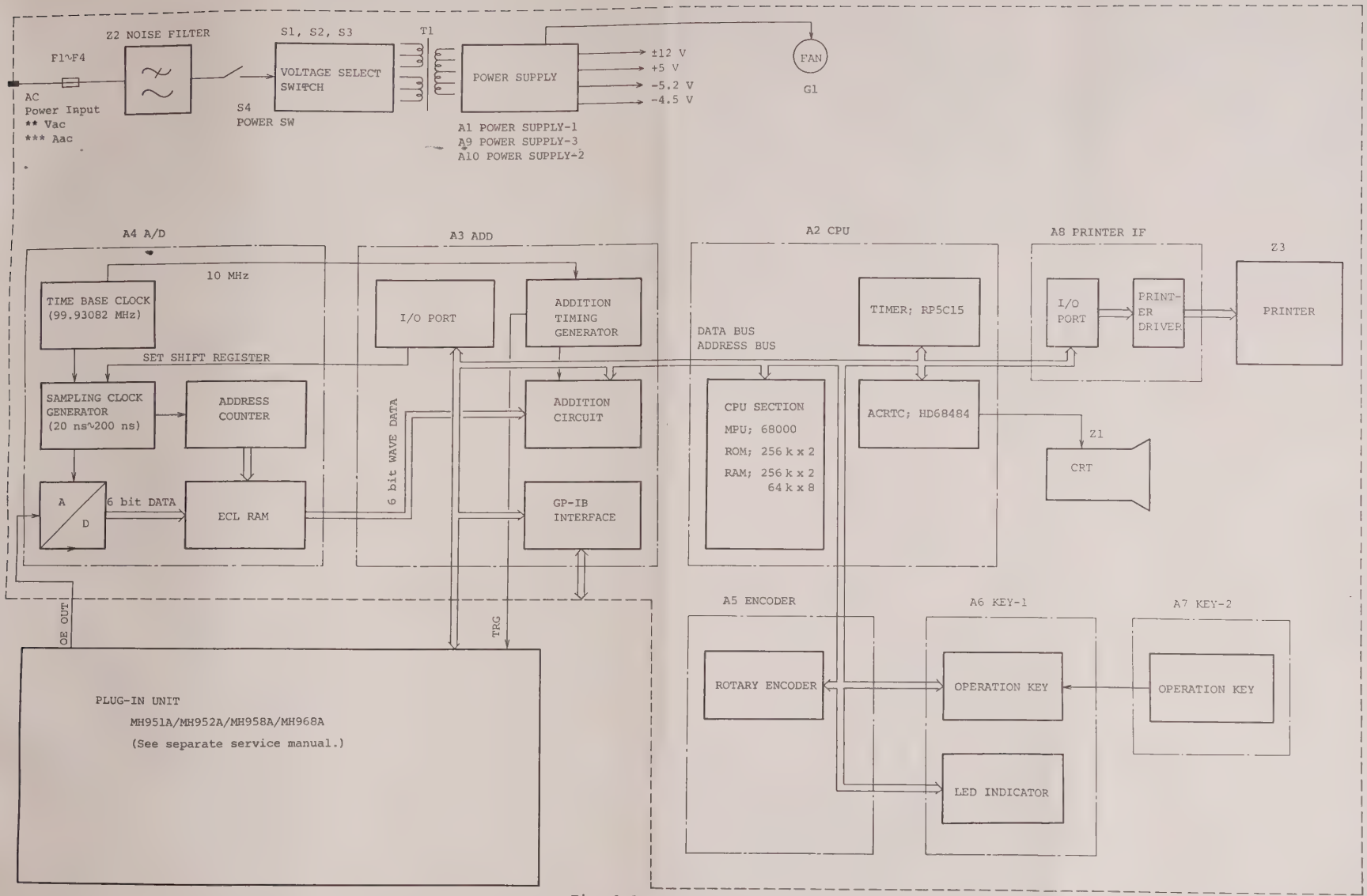


Fig. 3-2 MW920A Block Diagram

3.5.4 Overall troubleshooting and repair

START

Ensure that the POWER switch is OFF and check the setting of the VOLTAGE SELECTOR switch; then connect the power cord to the ac line.
(Refer to MW920A Operation Manual.)

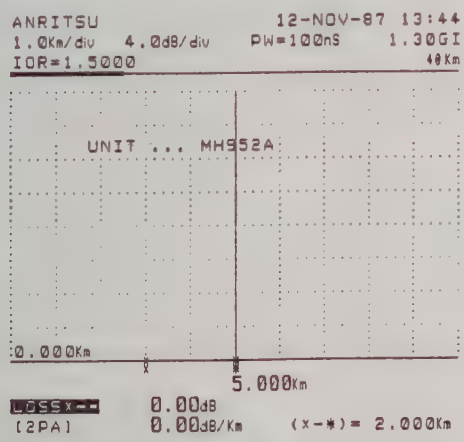
Set POWER switch to ON.

CRT display and LED lights and fan operates?

NO → 1

YES → 5

Former settings of CRT display and LED restored? (Factory settings are shown below.)

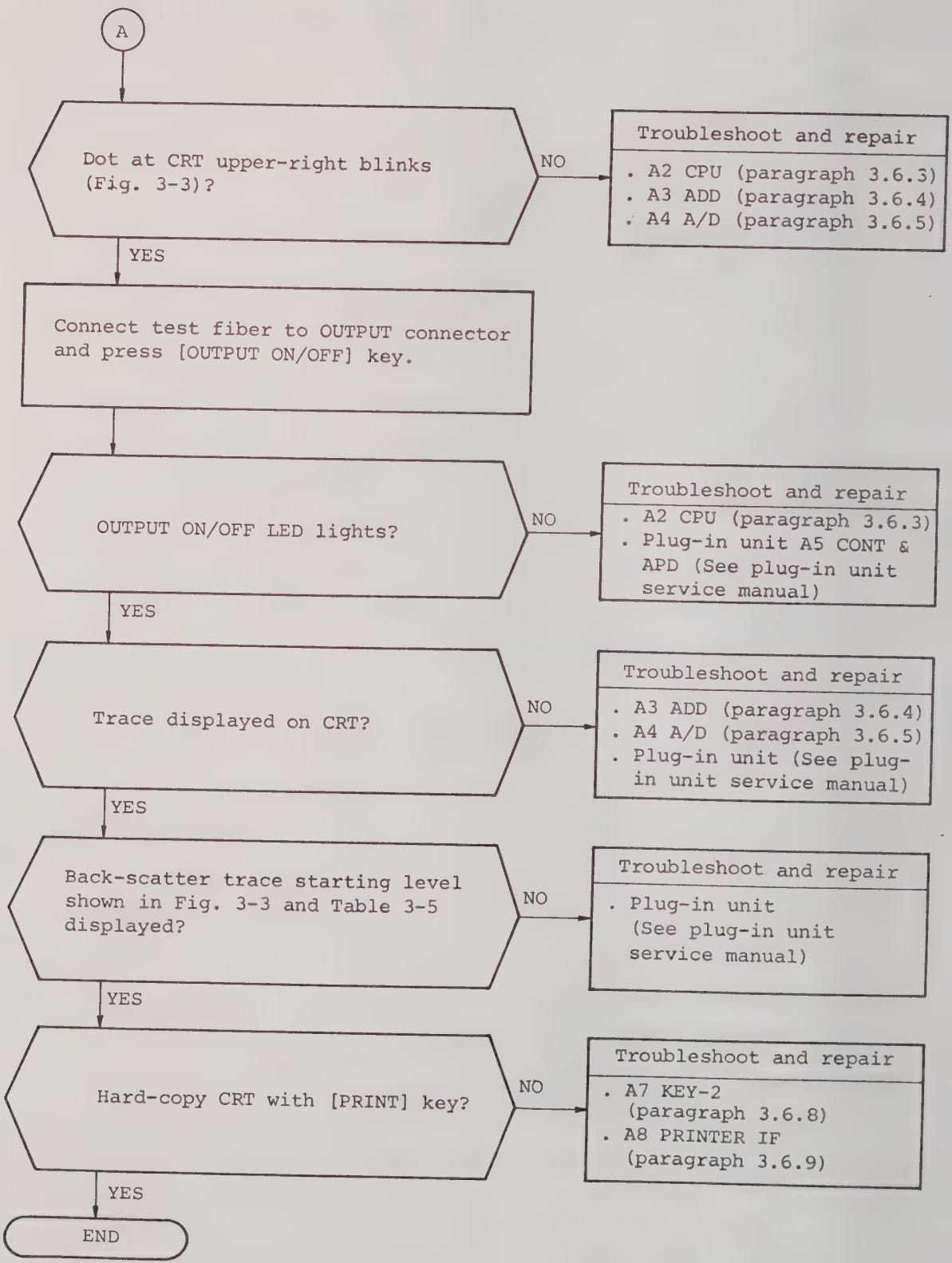


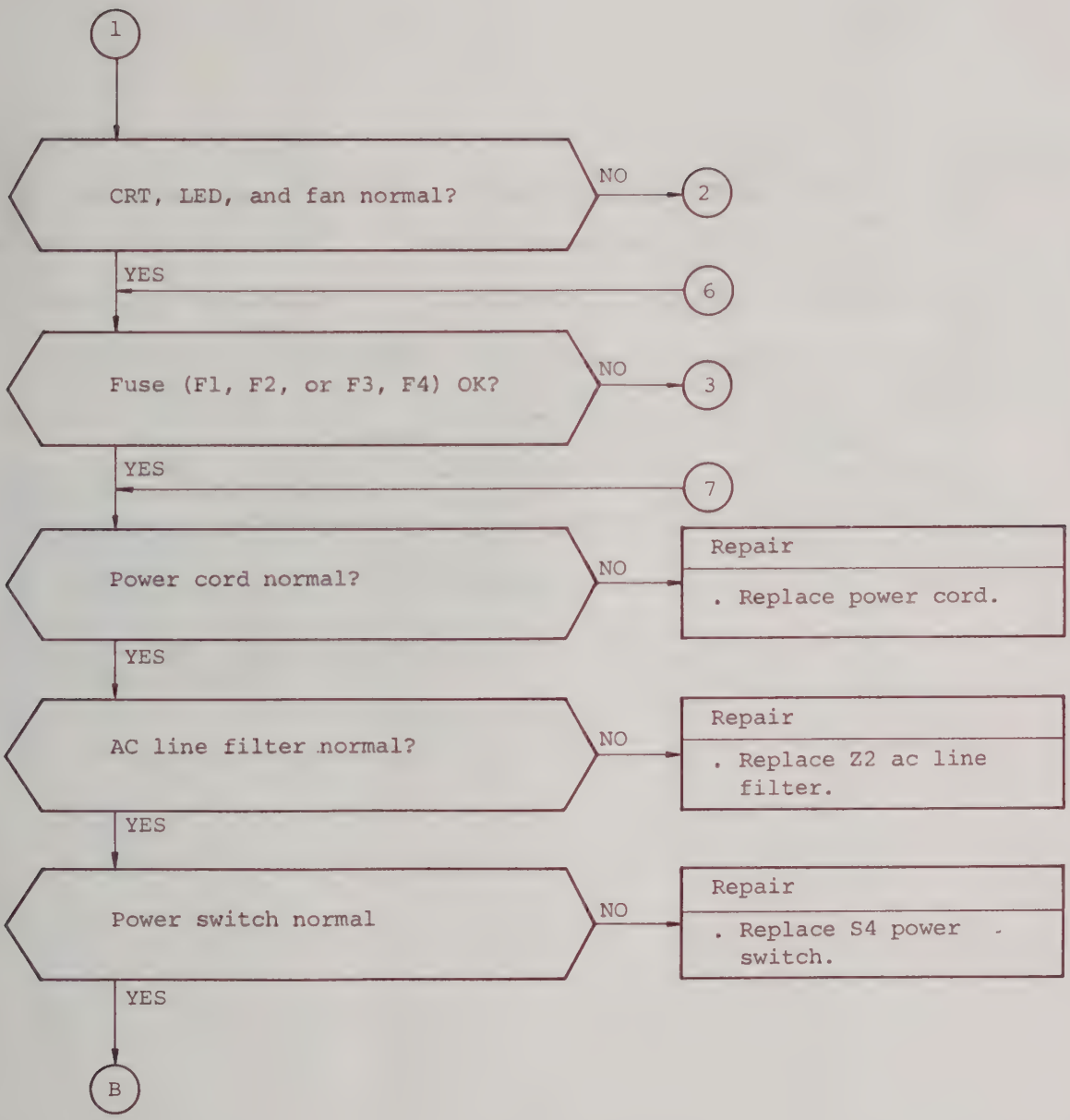
* The unit name displayed on the screen depends on the plug-in unit used.

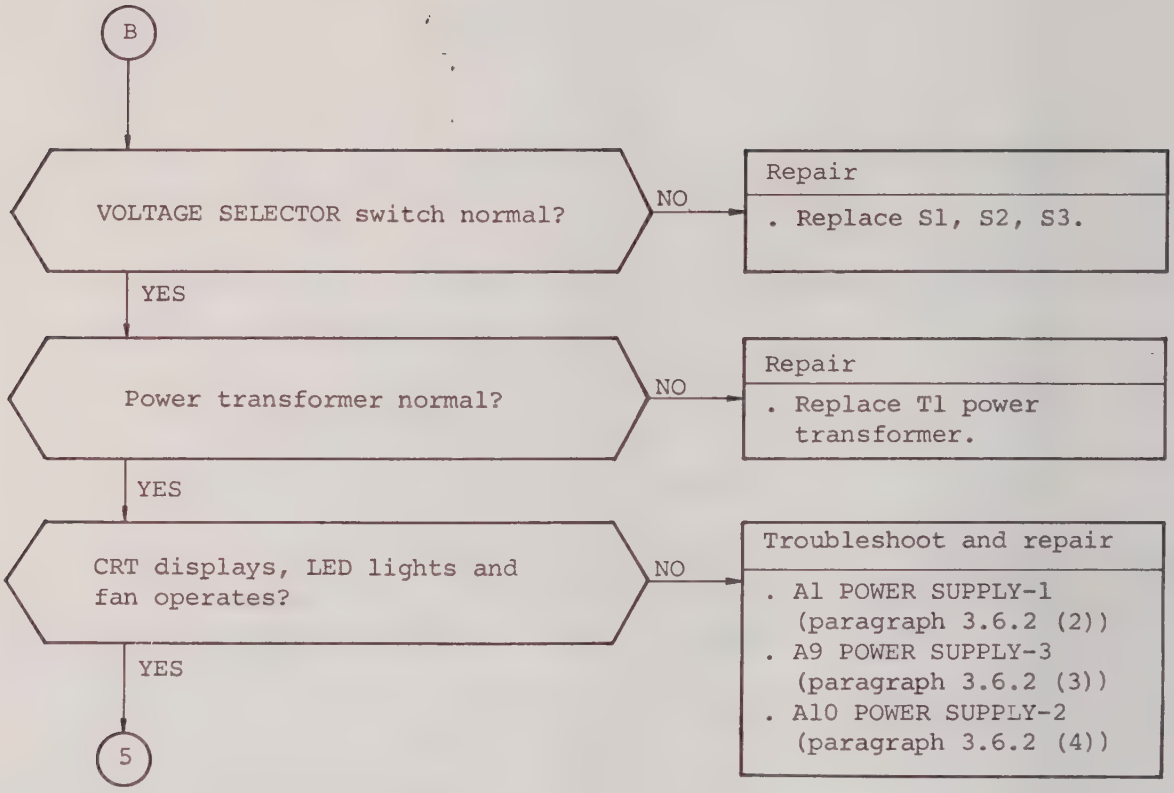
NO → Troubleshoot and repair

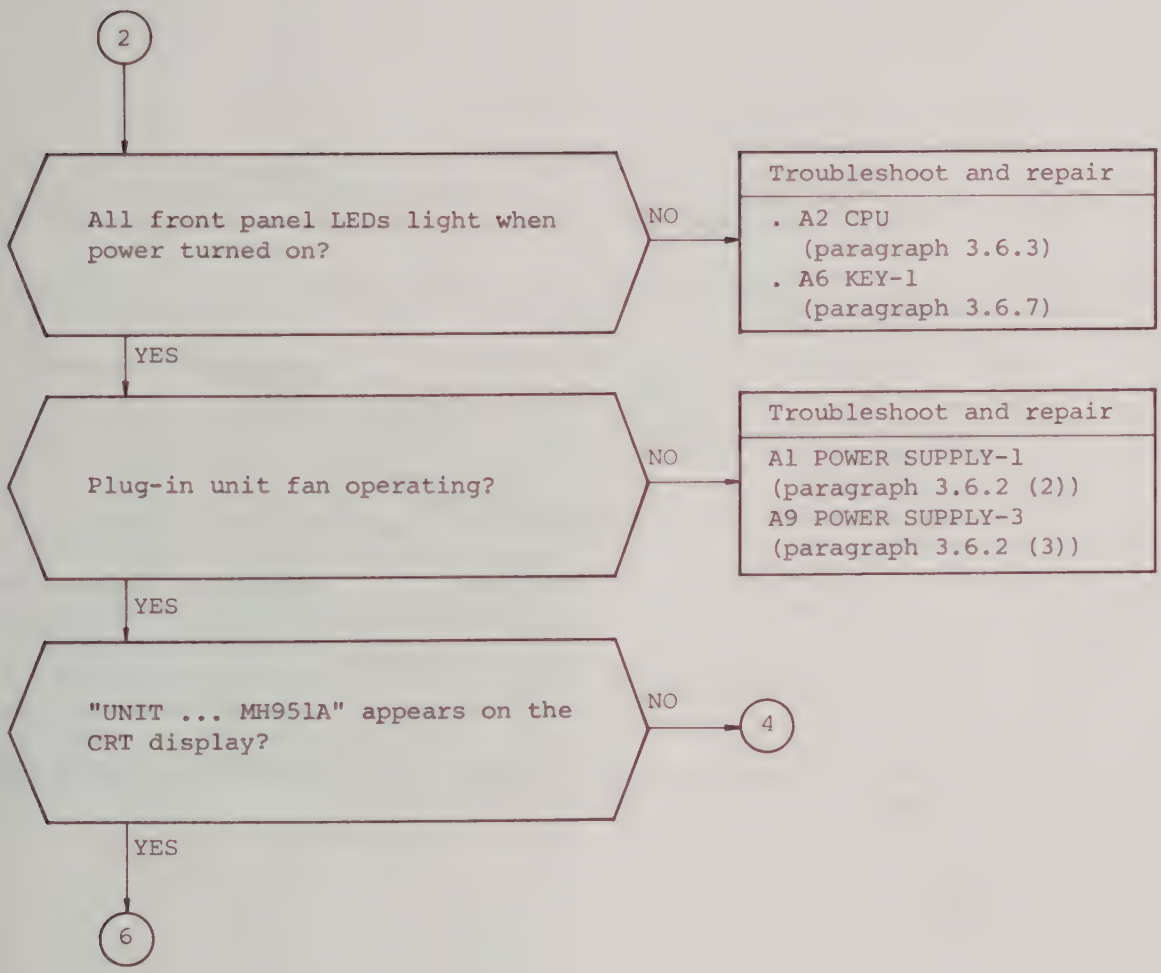
. A2 CPU (paragraph 3.6.3)

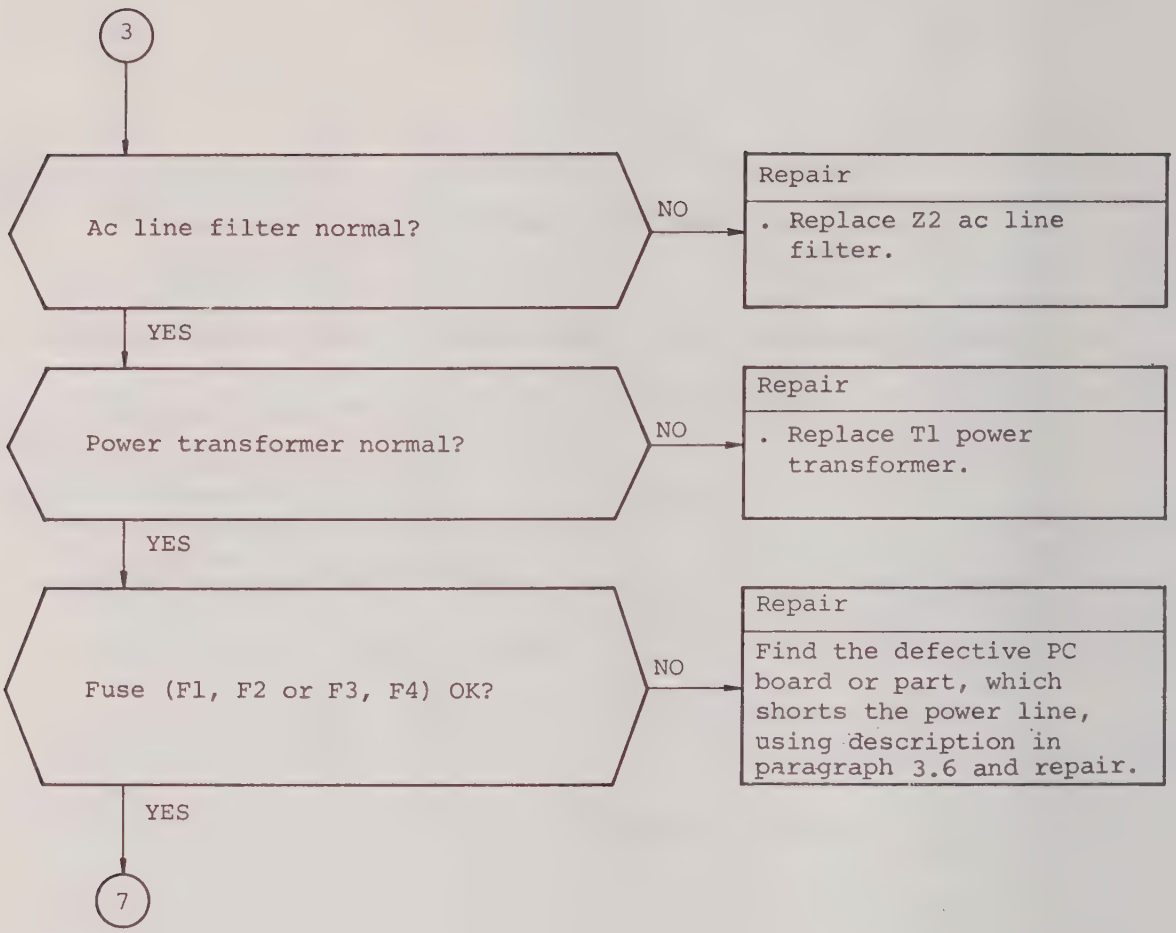
YES → A

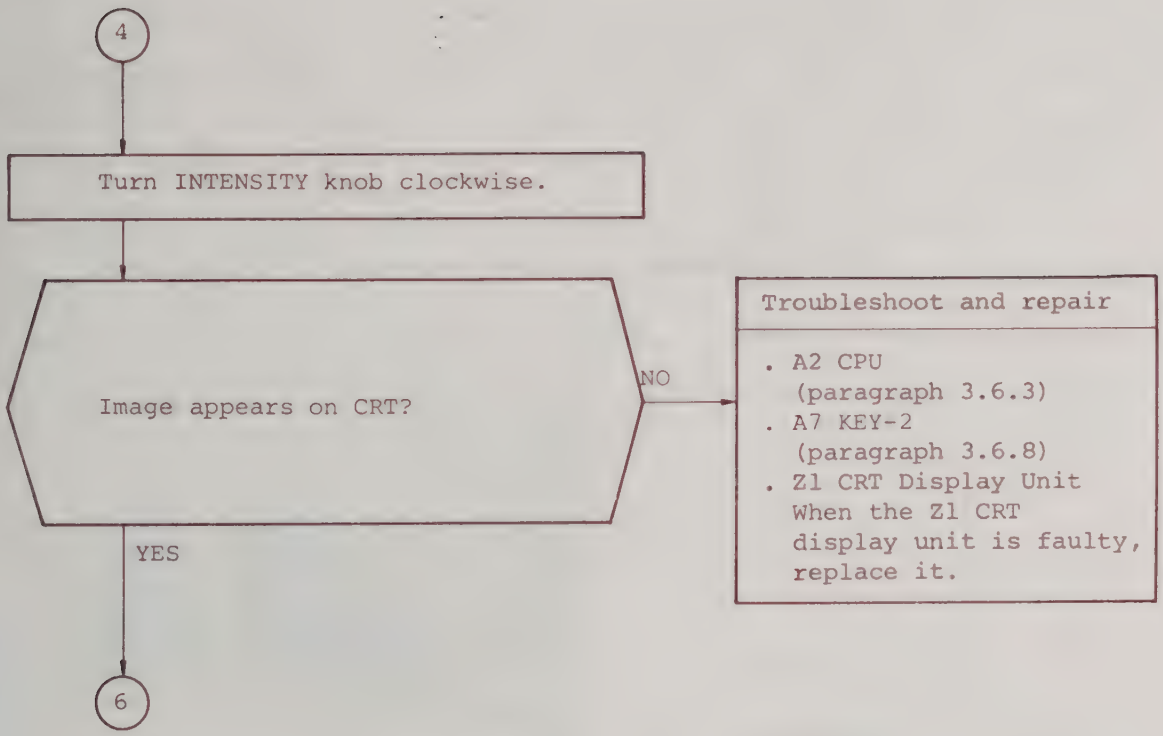

A
Dot at CRT upper-right blinks (Fig. 3-3)?
NO
Troubleshoot and repair
. A2 CPU (paragraph 3.6.3)
. A3 ADD (paragraph 3.6.4)
. A4 A/D (paragraph 3.6.5)
YES
Connect test fiber to OUTPUT connector and press [OUTPUT ON/OFF] key.
OUTPUT ON/OFF LED lights?
NO
Troubleshoot and repair
. A2 CPU (paragraph 3.6.3)
. Plug-in unit A5 CONT & APD (See plug-in unit service manual)
YES
Trace displayed on CRT?
NO
Troubleshoot and repair
. A3 ADD (paragraph 3.6.4)
. A4 A/D (paragraph 3.6.5)
. Plug-in unit (See plug-in unit service manual)
YES
Back-scatter trace starting level shown in Fig. 3-3 and Table 3-5 displayed?
NO
Troubleshoot and repair
. Plug-in unit (See plug-in unit service manual)
YES
Hard-copy CRT with [PRINT] key?
NO
Troubleshoot and repair
. A7 KEY-2 (paragraph 3.6.8)
. A8 PRINTER IF (paragraph 3.6.9)
YES
END

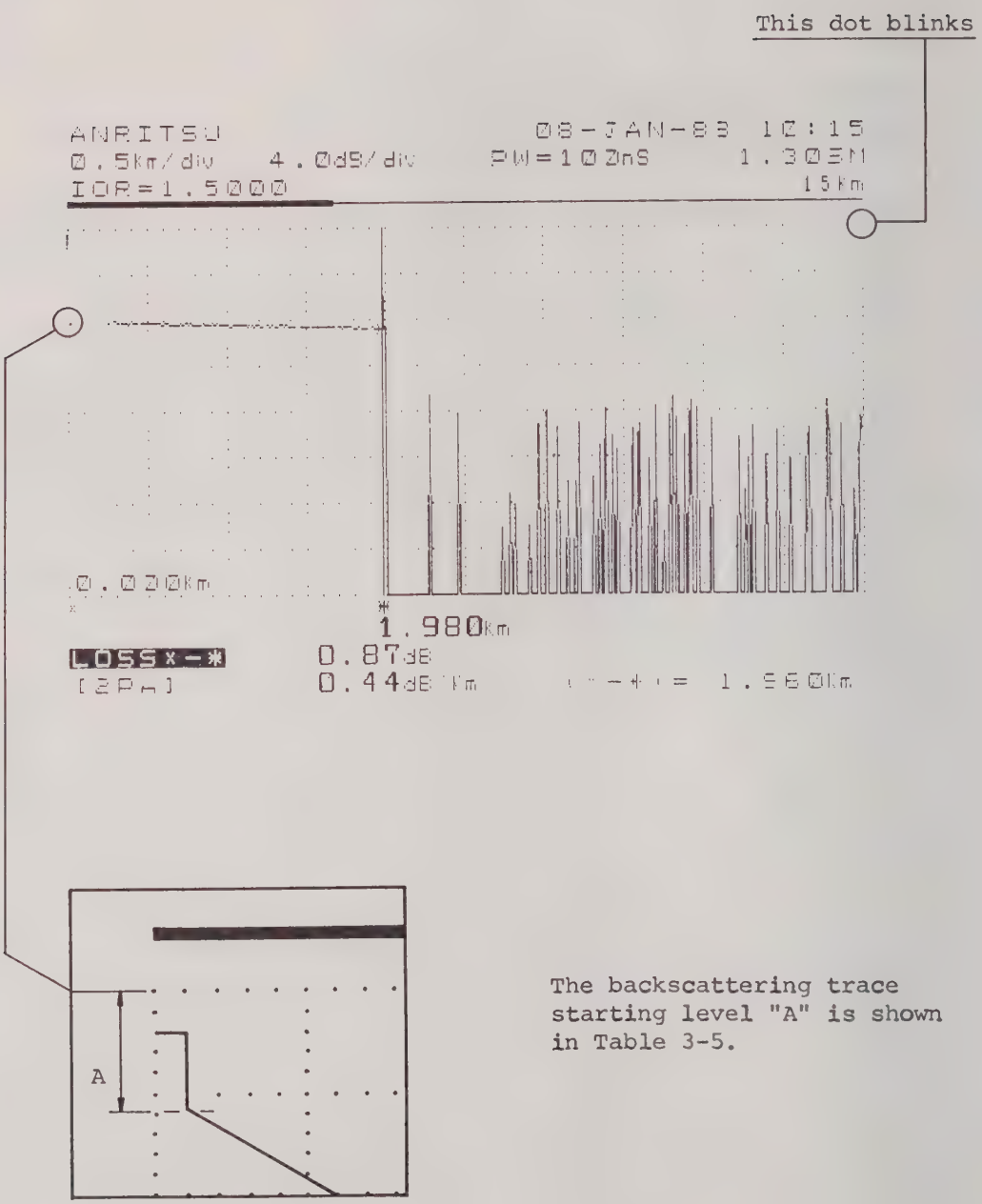

1
CRT, LED, and fan normal?
NO
2
YES
6
Fuse (F1, F2, or F3, F4) OK?
NO
3
YES
7
Power cord normal?
NO
Repair
. Replace power cord.
YES
AC line filter normal?
NO
Repair
. Replace Z2 ac line filter.
YES
Power switch normal
NO
Repair
. Replace S4 power switch.
YES
B


B
VOLTAGE SELECTOR switch normal?
NO
Repair
. Replace S1, S2, S3.
YES
Power transformer normal?
NO
Repair
. Replace T1 power transformer.
YES
CRT displays, LED lights and fan operates?
NO
Troubleshoot and repair
. A1 POWER SUPPLY-1 (paragraph 3.6.2 (2))
. A9 POWER SUPPLY-3 (paragraph 3.6.2 (3))
. A10 POWER SUPPLY-2 (paragraph 3.6.2 (4))
YES
5


2
All front panel LEDs light when power turned on?
NO
Troubleshoot and repair
. A2 CPU (paragraph 3.6.3)
. A6 KEY-1 (paragraph 3.6.7)
YES
Plug-in unit fan operating?
NO
Troubleshoot and repair
A1 POWER SUPPLY-1 (paragraph 3.6.2 (2))
A9 POWER SUPPLY-3 (paragraph 3.6.2 (3))
YES
"UNIT ... MH951A" appears on the CRT display?
NO
4
YES
6


3
Ac line filter normal?
NO
Repair
. Replace Z2 ac line filter.
YES
Power transformer normal?
NO
Repair
. Replace T1 power transformer.
YES
Fuse (F1, F2 or F3, F4) OK?
NO
Repair
Find the defective PC board or part, which shorts the power line, using description in paragraph 3.6 and repair.
YES
7


4
Turn INTENSITY knob clockwise.
Image appears on CRT?
NO
YES
6
Troubleshoot and repair
. A2 CPU
(paragraph 3.6.3)
. A7 KEY-2
(paragraph 3.6.8)
. Z1 CRT Display Unit
When the Z1 CRT
display unit is faulty,
replace it.



The backscattering trace starting level "A" is shown in Table 3-5.

Fig. 3-3 Back-scatter Trace Display

Table 3-5 Back-scatter Trace Starting Level "A"

Plug-in Unit	Test Fiber	λ	Pulse Width	ATT	* "A" (Typical Value)
MH951A	GI Fiber	0.85 μm	10 ns	OFF	Approx. 8.5 dB
MH952A	GI Fiber	1.3 μm	10 ns	OFF	Approx. 10.5 dB
MH958A	SM Fiber	1.3 μm	100 ns	OFF	Approx. 10.5 dB
MH968A	SM Fiber	1.55 μm	100 ns	OFF	Approx. 8.5 dB

* Level A must be within the value shown in Table 3-5.

3.6 Troubleshooting Each PC Board

3.6.1 Introduction 1

Find the faulty part using the procedures described in this paragraph.

Then, replace the faulty part.

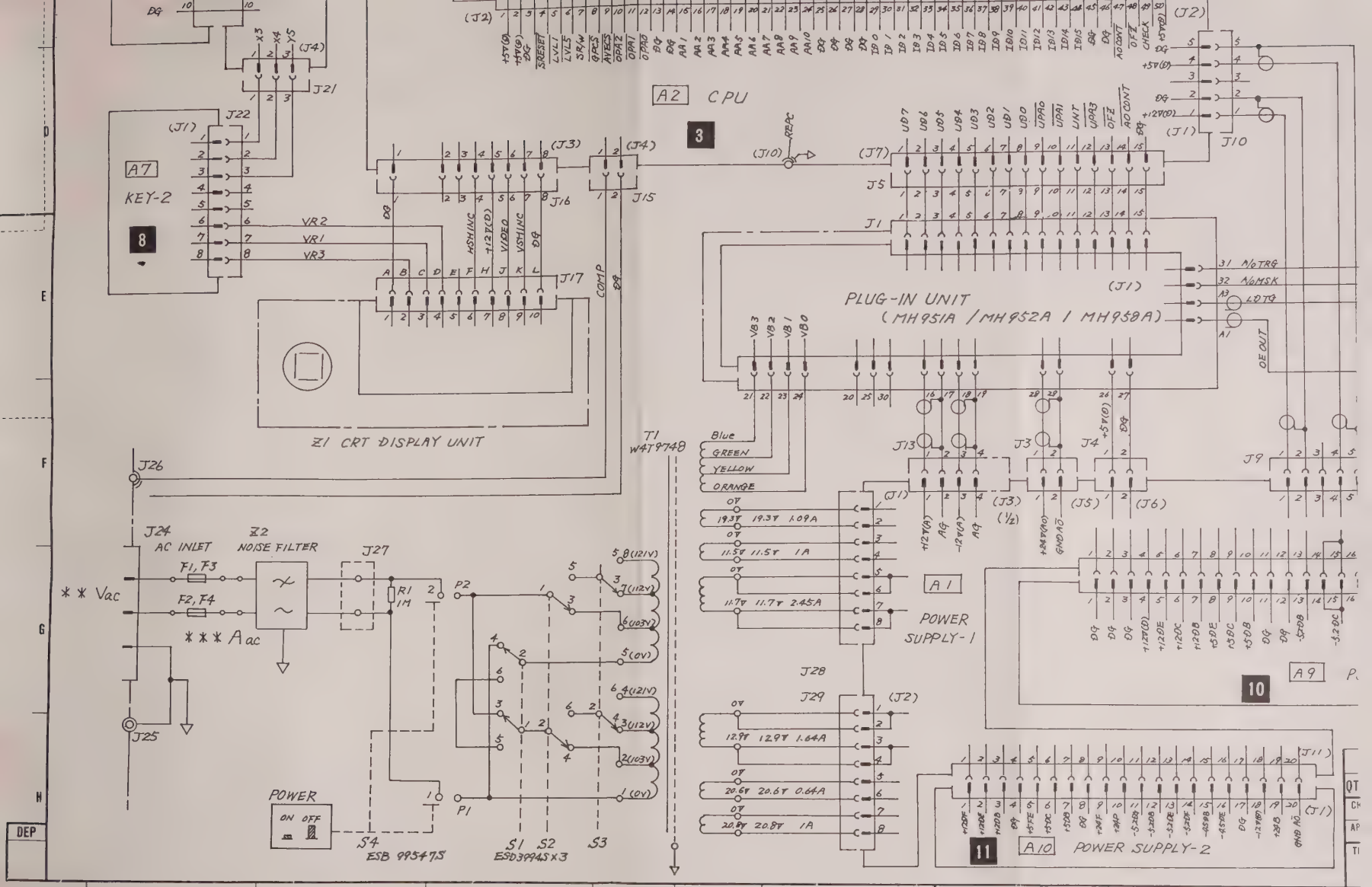
Circuit diagram 1 shows all circuit connections of the MW920A.

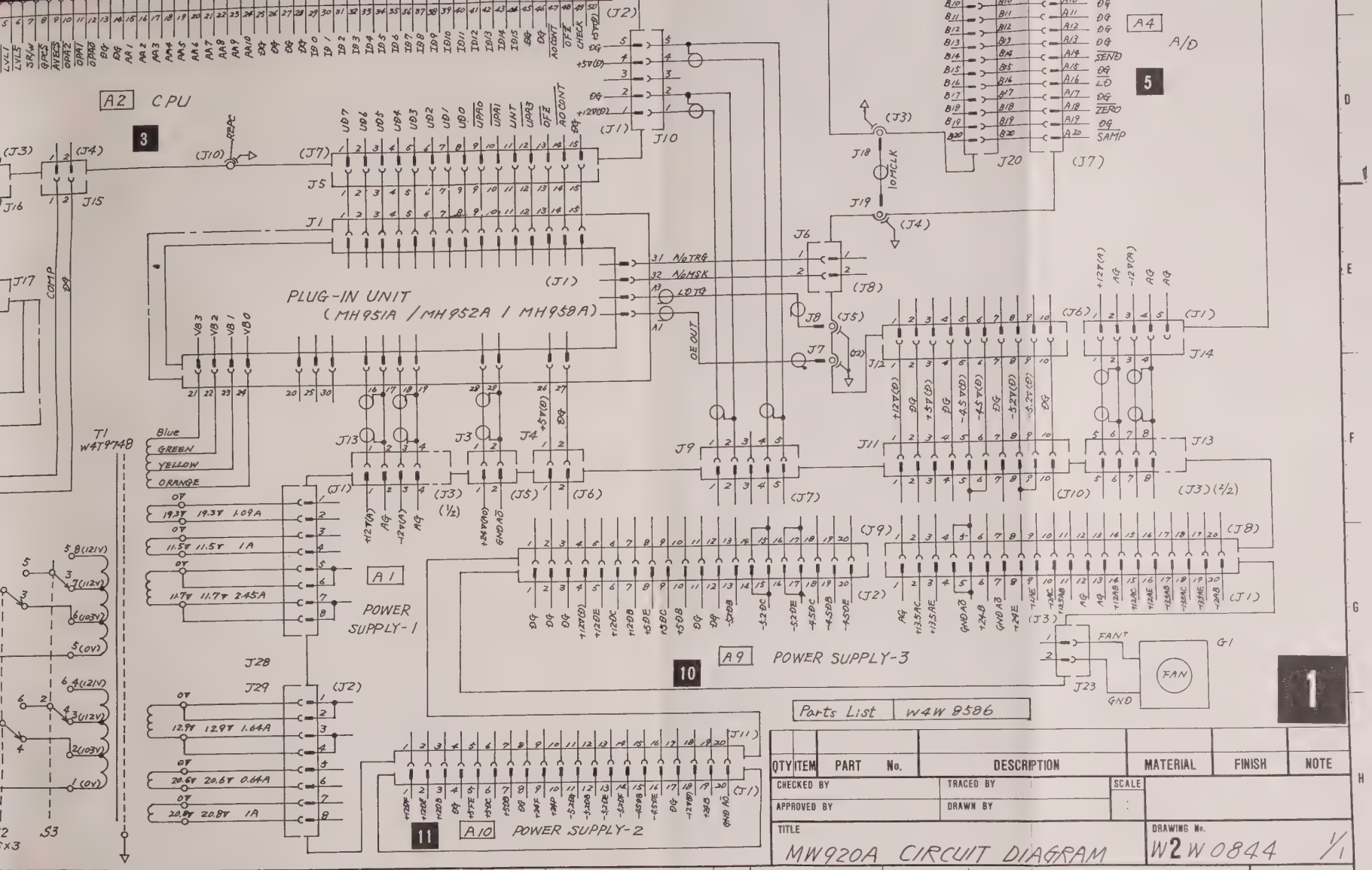
Note:

The TTL, CMOS, and ECL voltage levels are shown in Table 3-6.

Table 3-6 Logic Levels and Voltages

Logic Level	TTL	CMOS	ECL
High	$\geqq$2.0	$\geqq$3.15	$\geqq$-0.8
Low	$\leqq$0.8	$\leqq$1.3	$\leqq$-1.9


A2 CPU
A7 KEY-2
Z1 CRT DISPLAY UNIT
PLUG-IN UNIT
(MH951A / MH952A / MH958A)
A1 POWER SUPPLY-1
A10 POWER SUPPLY-2
A9
Z2 NOISE FILTER
J24 AC INLET
J25
J26
J27
J28
J29
T1 W4T9748
** Vac
*** Aac
F1, F3
F2, F4
R1 1M
POWER
ON OFF
S4 ESB 995475
S1 S2 S3 ESB39945x3
Blue
GREEN
YELLOW
ORANGE
VR1
VR2
VR3
DEP



Parts List	W4W 8586

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH	NOTE

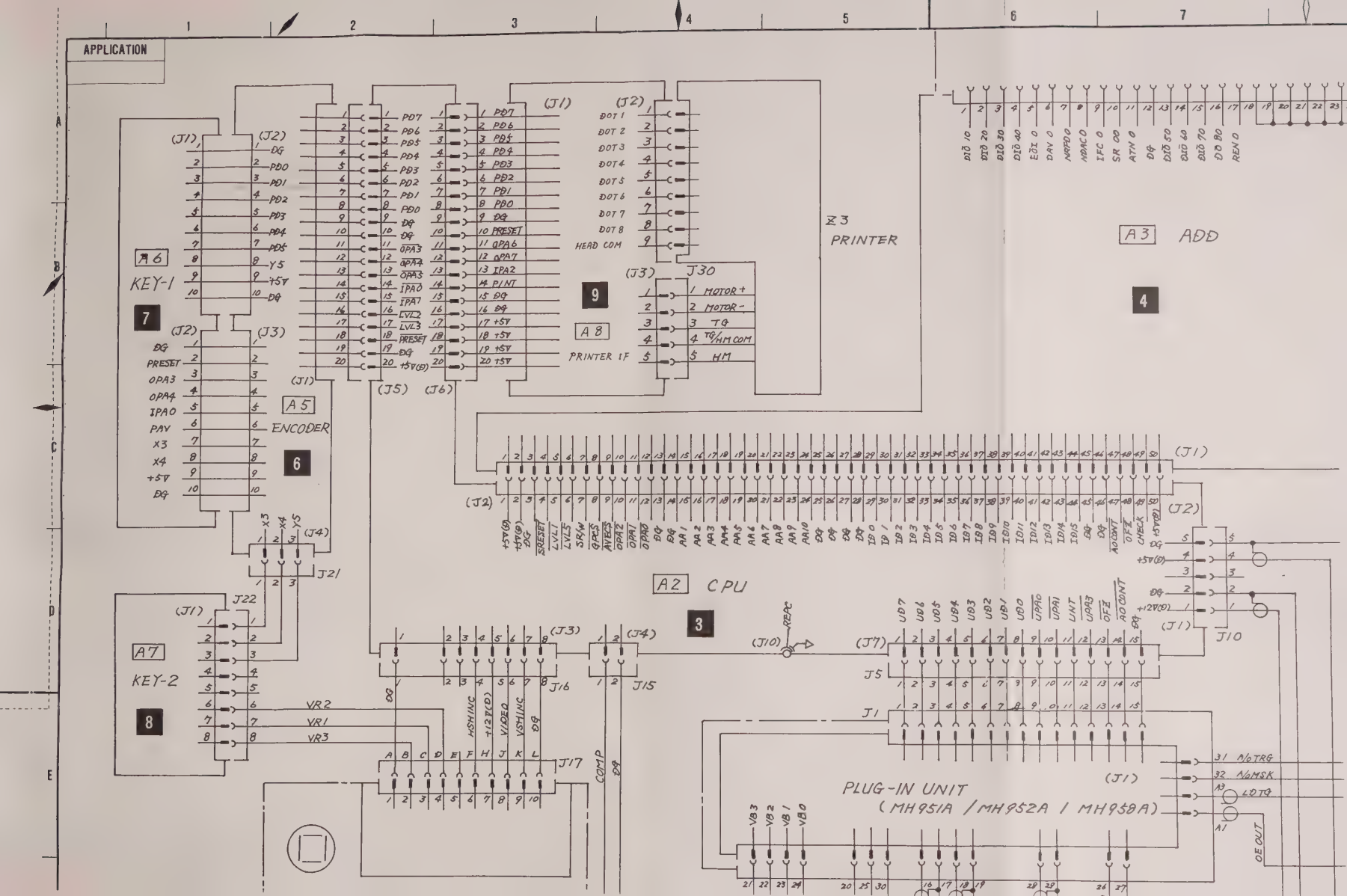
CHECKED BY	TRACED BY	SCALE
APPROVED BY	DRAWN BY	

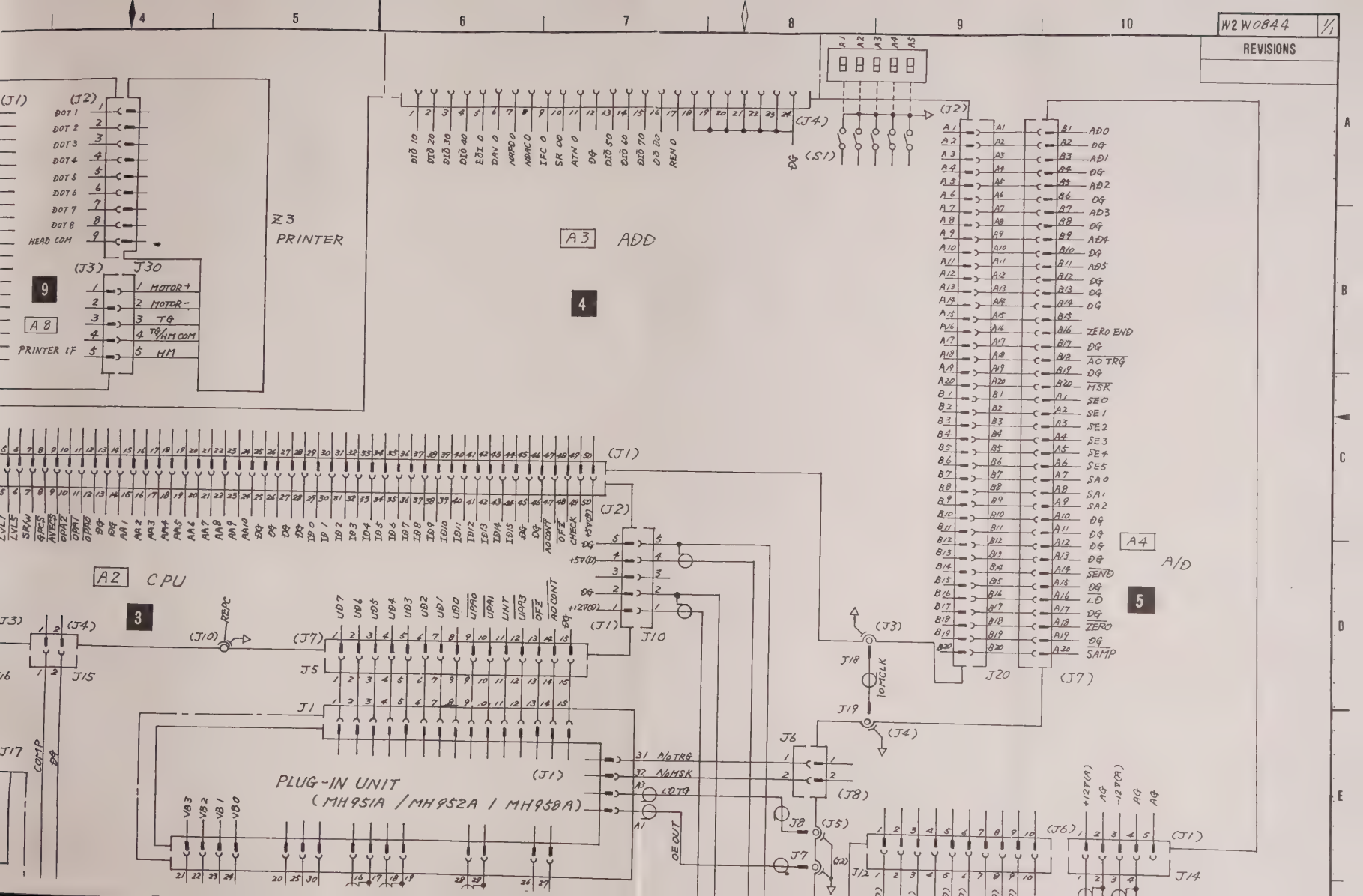
TITLE: MW920A CIRCUIT DIAGRAM

DRAWING No.: W2W0844 1/1

ANRITSU CORP.

3-21/3-22


APPLICATION
A6
KEY-1
7
A5
ENCODER
6
A7
KEY-2
8
A8
PRINTER I/F
9
Σ3
PRINTER
A3
ADD
4
A2
CPU
3
PLUG-IN UNIT
(MH951A / MH952A / MH958A)
J1
J2
J3
J4
J5
J6
J7
J10
J15
J16
J17
J21
J22
J30
PD7
PD6
PD5
PD4
PD3
PD2
PD1
PD0
DG
PRESET
OPA3
OPA4
IPA0
IPA7
+5V
X3
X4
Y5
HSHNC
VIDEO
VSHNC
COMP
VR1
VR2
VR3
DOT 1
DOT 2
DOT 3
DOT 4
DOT 5
DOT 6
DOT 7
DOT 8
HEAD COM
MOTOR+
MOTOR-
TQ
TQ/HM COM
HM
REAC
LDTQ
OE OUT


W2 W0844 1/1
REVISIONS
A3 ADD
A2 CPU
A4 A/D
Z3 PRINTER
PRINTER I/F
PLUG-IN UNIT
(MH9S1A / MH952A / MH958A)
J1
J2
J3
J4
J5
J6
J7
J8
J10
J14
J15
J17
J18
J19
J20
J30
(S1)
DOT 1
DOT 2
DOT 3
DOT 4
DOT 5
DOT 6
DOT 7
DOT 8
HEAD COM
MOTOR+
MOTOR-
TG
TG/AM COM
HM
ADO
AD1
AD2
AD3
AD4
AD5
ZERO END
AO TRG
MSK
SEO
SE1
SE2
SE3
SE4
SE5
SA0
SA1
SA2
SEND
LD
ZERO
SAMP
10MCLK
LDTG
OE OUT
COMP
+12V(A)
-12V(A)
+5V(D)

3.6.2 POWER SUPPLY

(A1 POWER SUPPLY 1 2,

A9 POWER SUPPLY 3 10,

A10 POWER SUPPLY 2 11)

(1) Introduction

The MW920A Power Supply is composed of three PC boards (A1 POWER SUPPLY 1, A9 POWER SUPPLY 3, and A10 POWER SUPPLY 2) which make up one power supply unit.

The ground line of the dc power supplies regulated on these PC boards is separated into analog ground (AG) and digital ground (DG), and a switching regulation system and series regulation system are used. This is summarized in Table 3-7.

Table 3-7 Dc Power Supply Composition

No.	Power Supply	Ground	Regulation System	Remarks
1	+5 VD	Digital	Switching regulator	
2	+12 VD	Digital	Switching regulator	
3	-5.2 VD	Digital	Switching regulator	
4	-4.5 VD	Digital	Series regulator	-5.2 VD used as reference voltage
5	+12 VA	Analog	Switching regulator and Series regulator	
6	-12 VA	Analog	Switching regulator and Series regulator	
7	+24 V (AO)	(Floating)	Switching regulator	
8	-12 VD	Digital	DC-DC inverter	

Note:

VA, VD, and V (AO) mean the power supply voltages for analog, digital, and AO switch circuits, respectively.

(2) A1 POWER SUPPLY 1 2

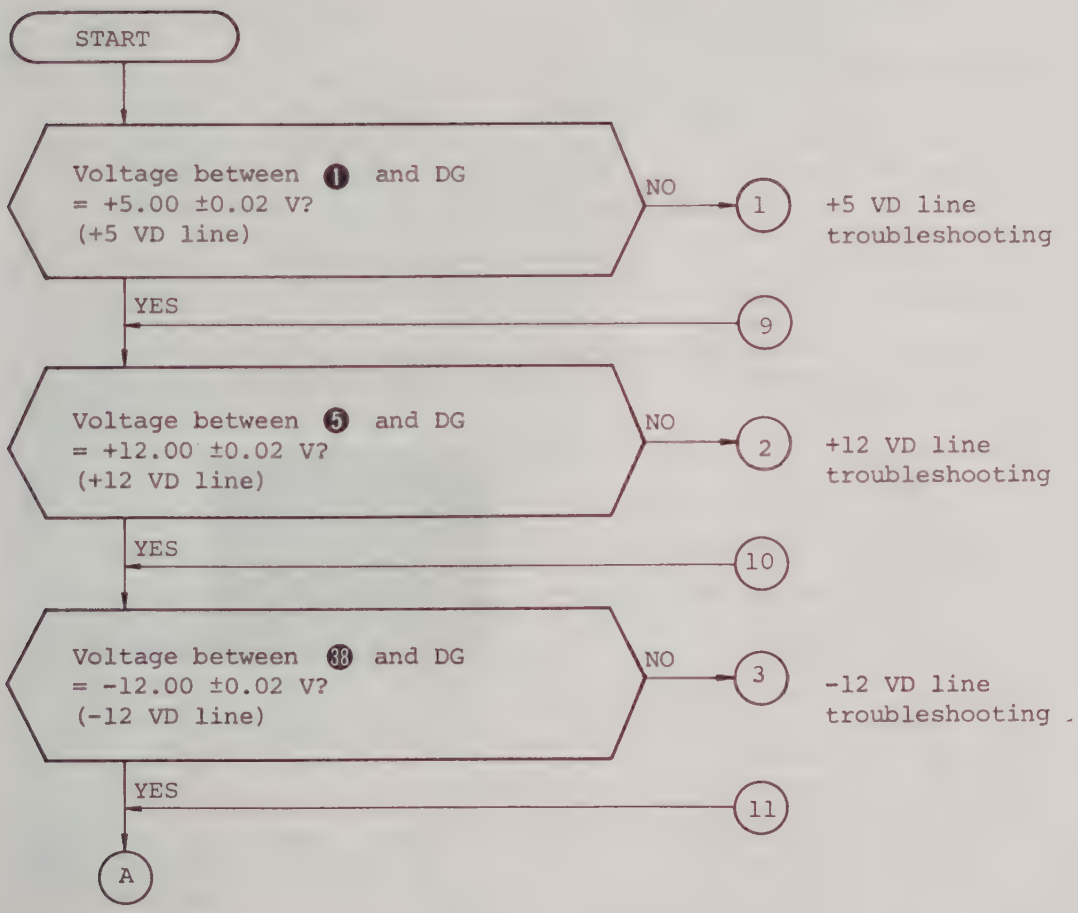
(a) Circuit description

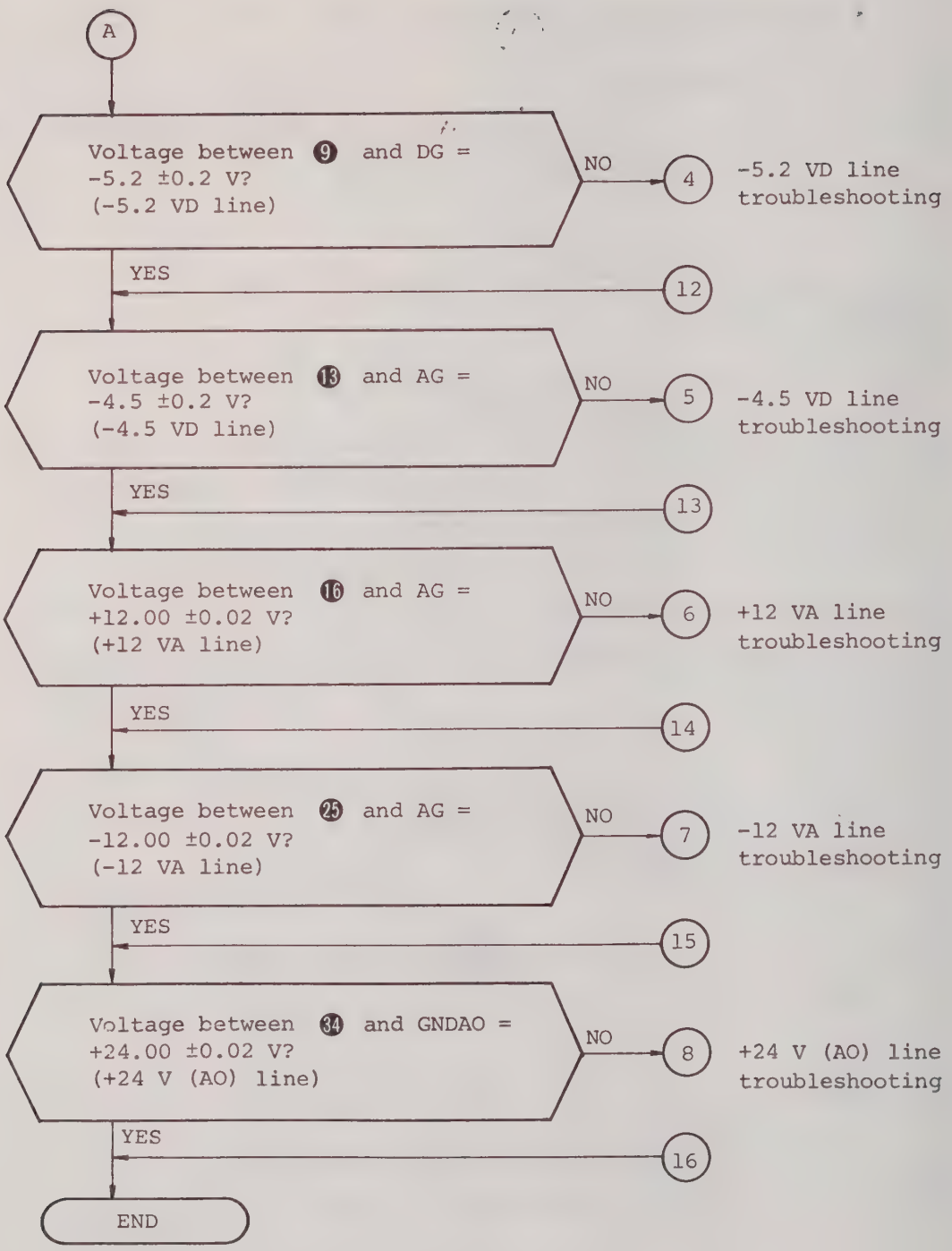
This PC board consists of the rectifiers for all the power supplies, the series/switching regulators for the ±12 VA power supplies, and +12 VD to -12 VD dc-dc inverter.

(b) Troubleshooting and repair

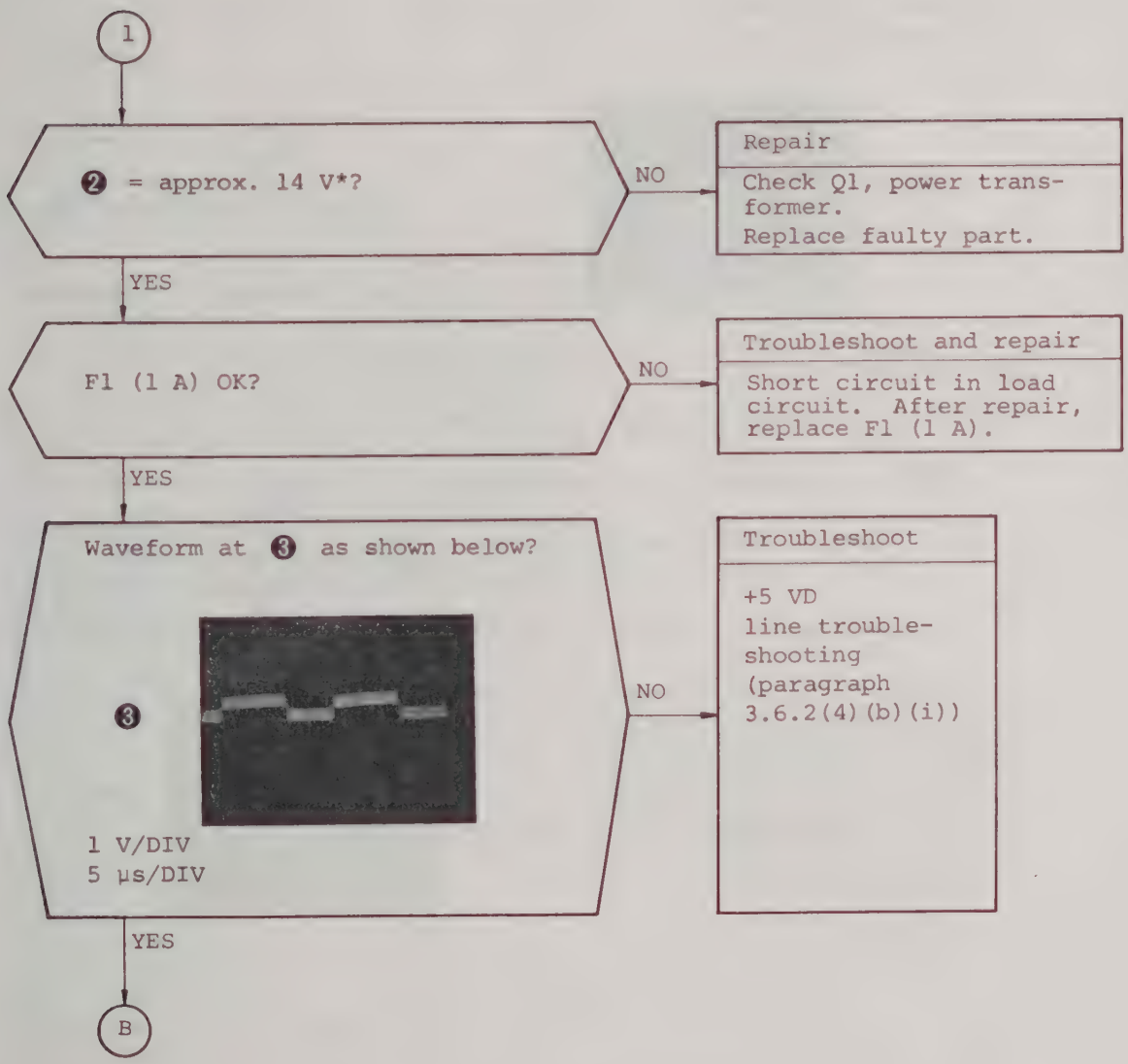
Caution:

Be careful not to touch PC boards with each other or the cabinet.

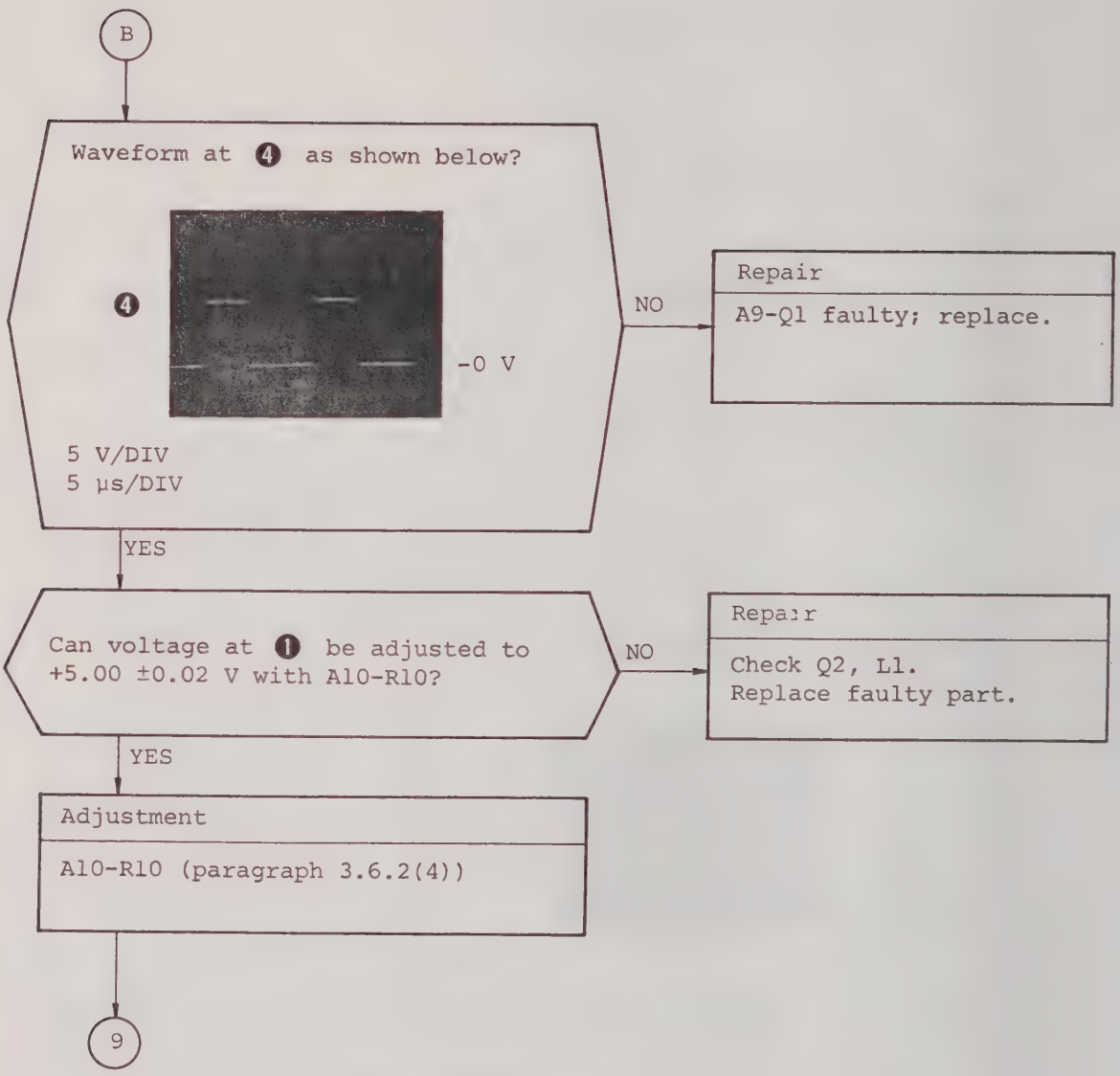



A
Voltage between ❾ and DG =
-5.2 ±0.2 V?
(-5.2 VD line)
NO
4
-5.2 VD line
troubleshooting
YES
12
Voltage between ⓭ and AG =
-4.5 ±0.2 V?
(-4.5 VD line)
NO
5
-4.5 VD line
troubleshooting
YES
13
Voltage between ⓰ and AG =
+12.00 ±0.02 V?
(+12 VA line)
NO
6
+12 VA line
troubleshooting
YES
14
Voltage between ㉕ and AG =
-12.00 ±0.02 V?
(-12 VA line)
NO
7
-12 VA line
troubleshooting
YES
15
Voltage between ㉞ and GNDAO =
+24.00 ±0.02 V?
(+24 V (AO) line)
NO
8
+24 V (AO) line
troubleshooting
YES
16
END

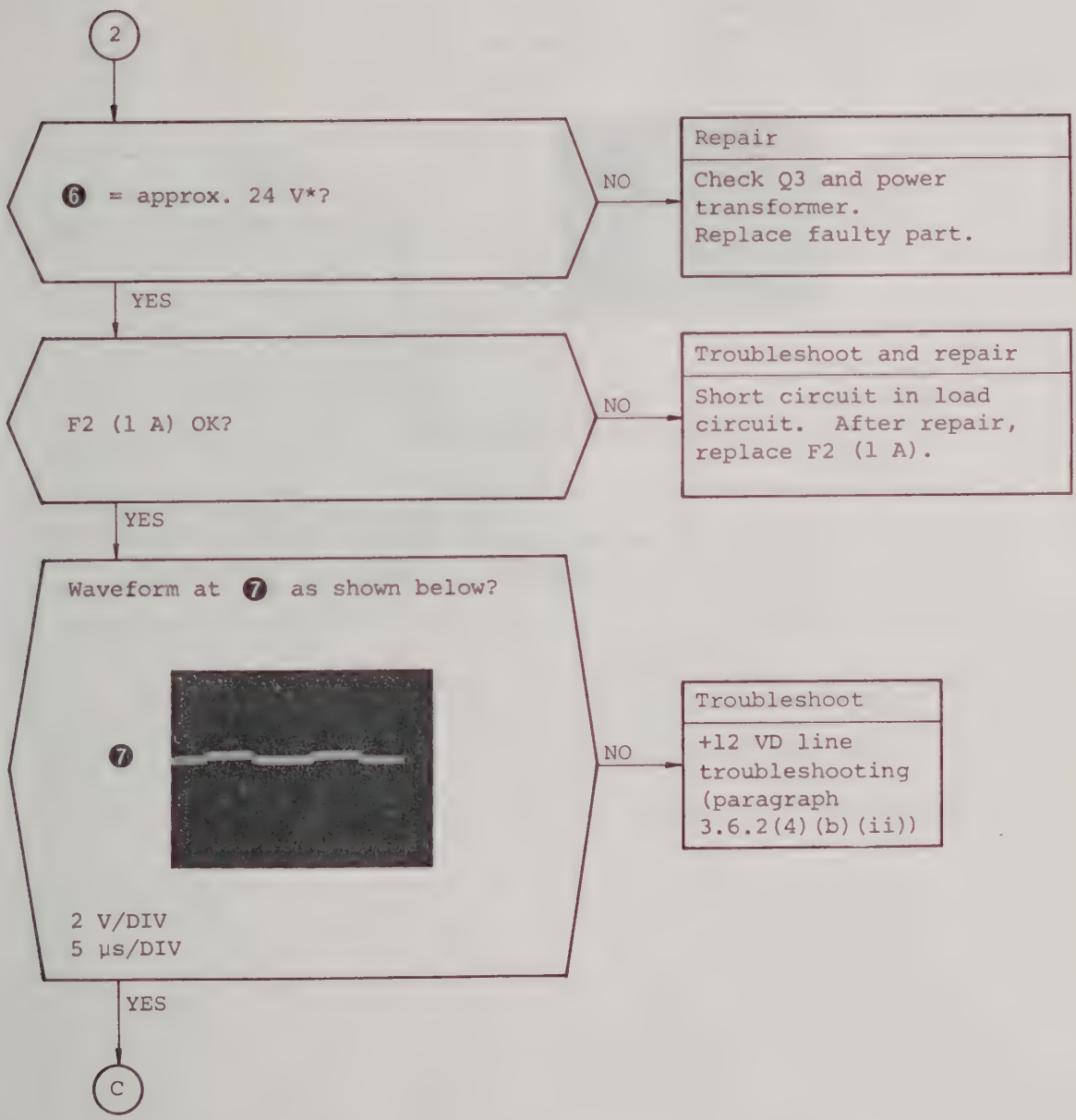
[+5 VD line troubleshooting]



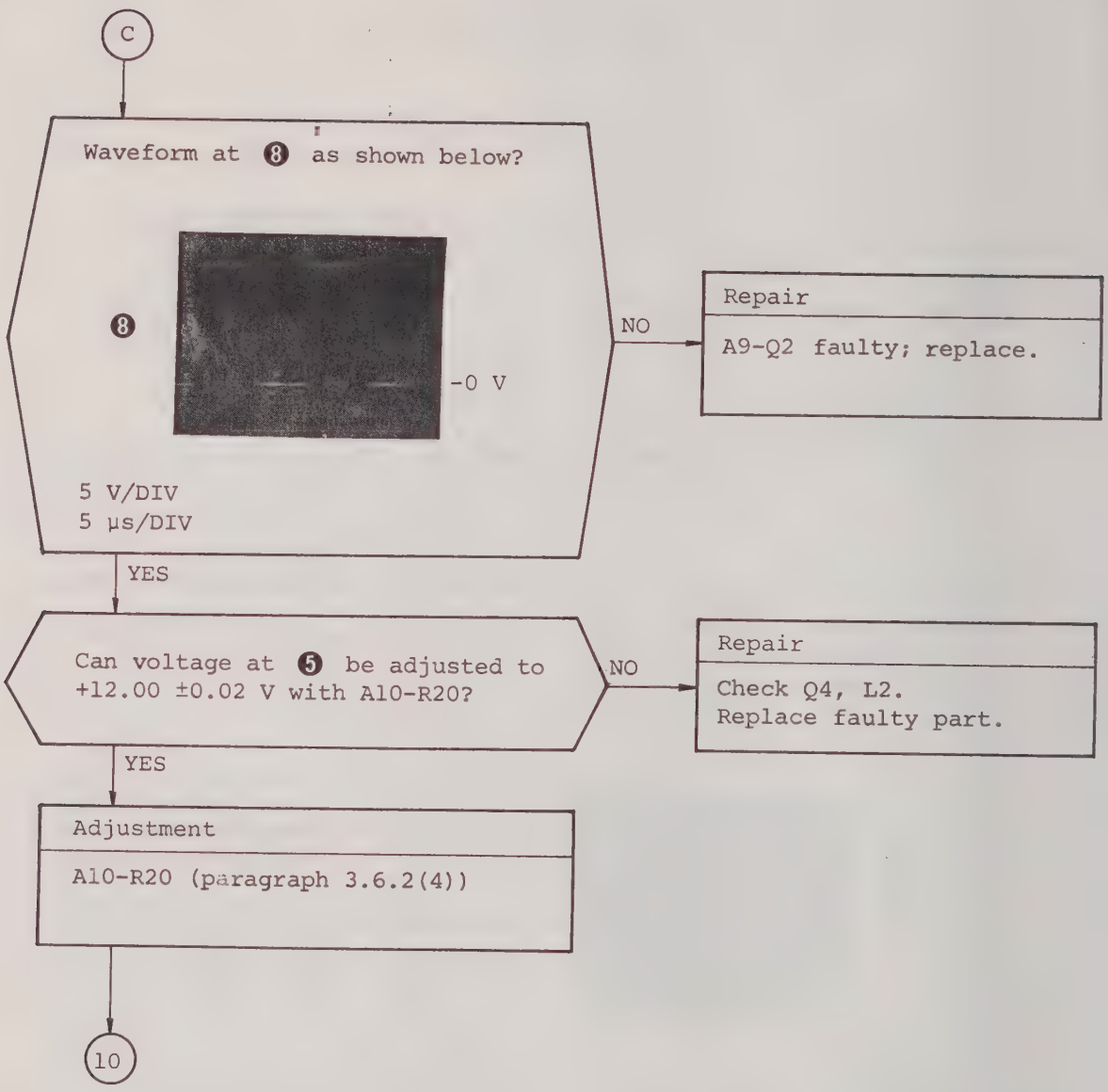
*: Value at nominal ac line voltage ±0%.
Value may be different for different ac line voltage


B
Waveform at ❹ as shown below?
❹
-0 V
5 V/DIV
5 µs/DIV
NO
Repair
A9-Q1 faulty; replace.
YES
Can voltage at ❶ be adjusted to +5.00 ±0.02 V with A10-R10?
NO
Repair
Check Q2, L1.
Replace faulty part.
YES
Adjustment
A10-R10 (paragraph 3.6.2(4))
9

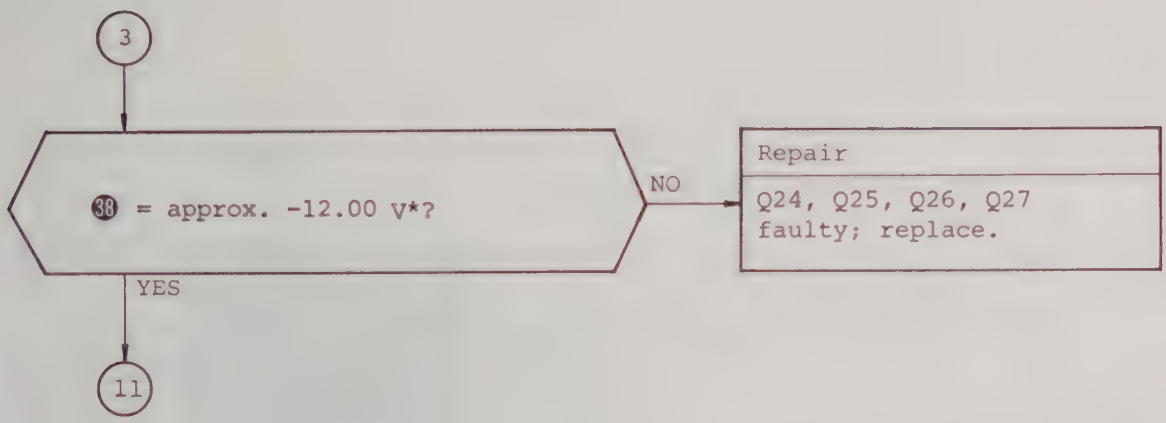
[+12 VD line troubleshooting]



*: Value at nominal ac line voltage ±0%.
Value may be different for different ac line voltage

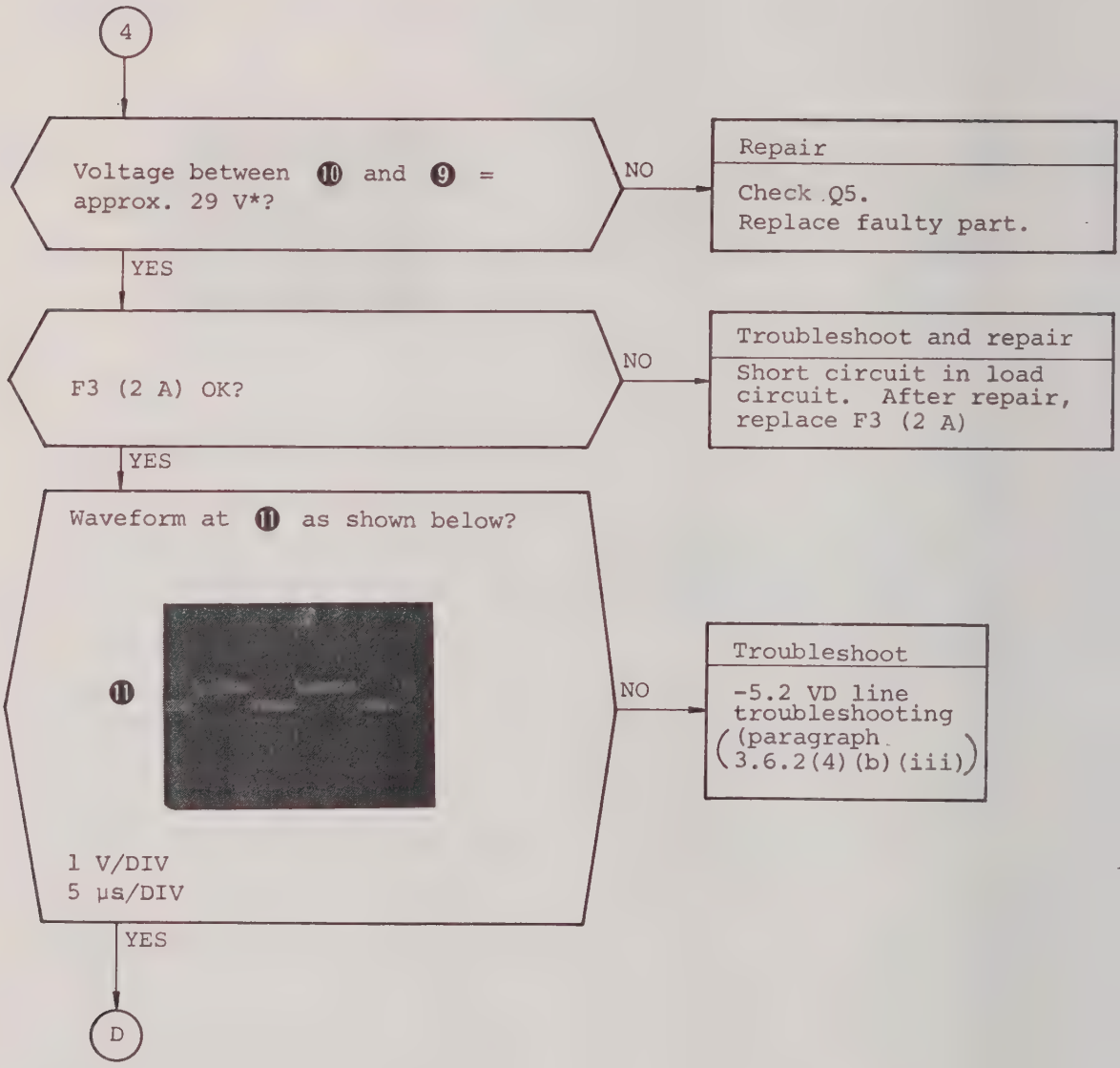

C
Waveform at ❽ as shown below?
❽
-0 V
5 V/DIV
5 µs/DIV
NO
Repair
A9-Q2 faulty; replace.
YES
Can voltage at ❺ be adjusted to +12.00 ±0.02 V with A10-R20?
NO
Repair
Check Q4, L2.
Replace faulty part.
YES
Adjustment
A10-R20 (paragraph 3.6.2(4))
10

[-12 VD line troubleshooting]

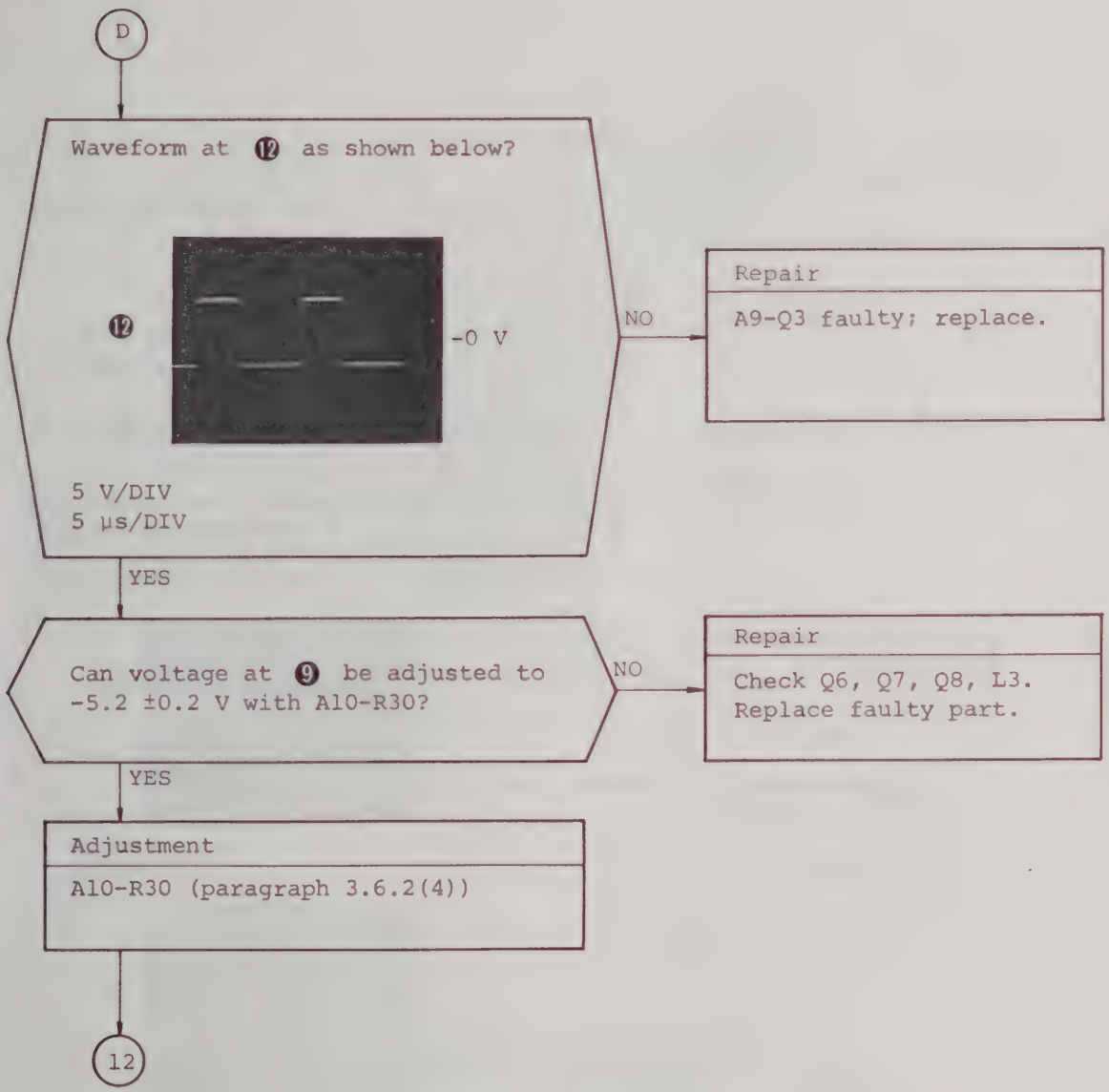


*: Value at nominal ac line voltage ±0%.
Value may be different for different ac line voltage

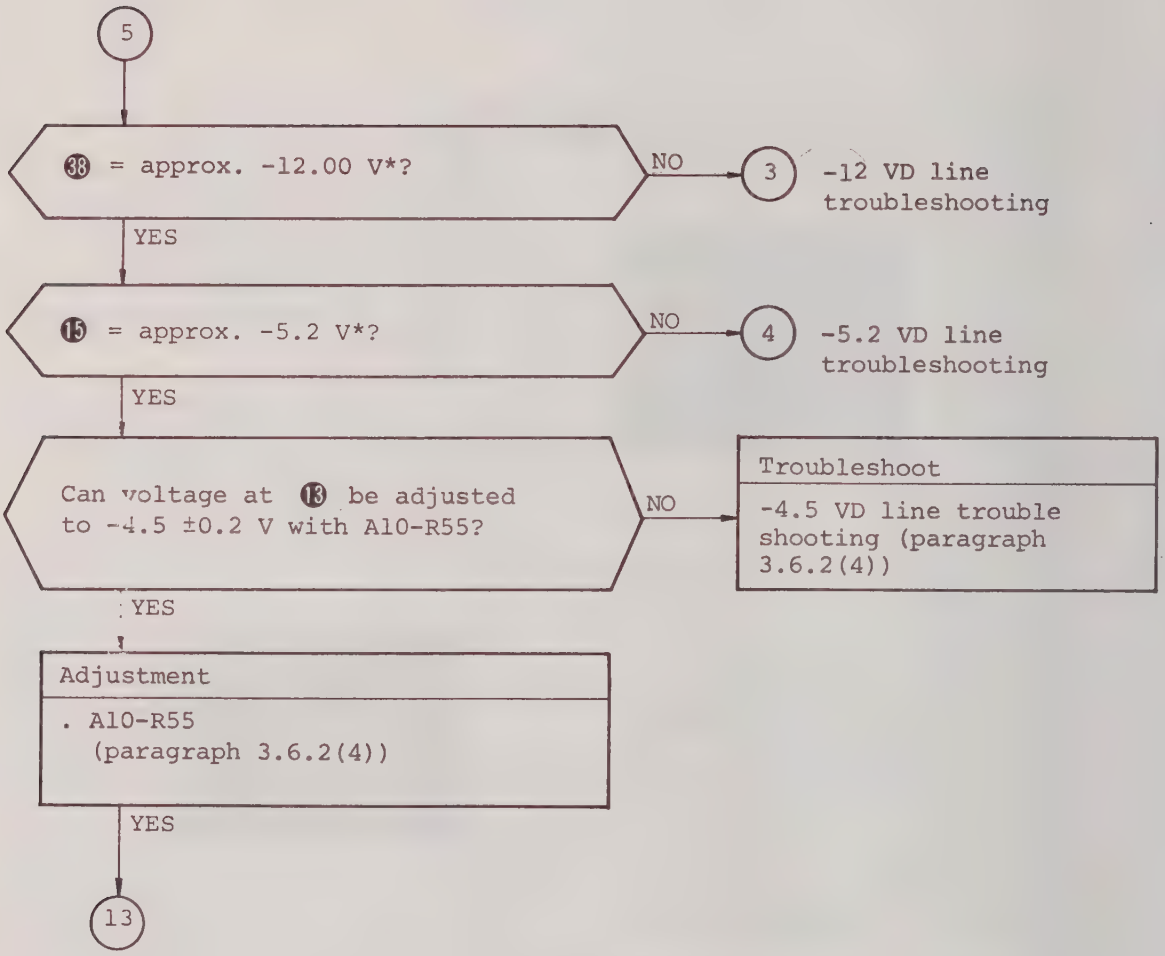
[-5.2 VD line troubleshooting]



*: Value at nominal ac line voltage ±0%.
Value may be different for different ac line voltage

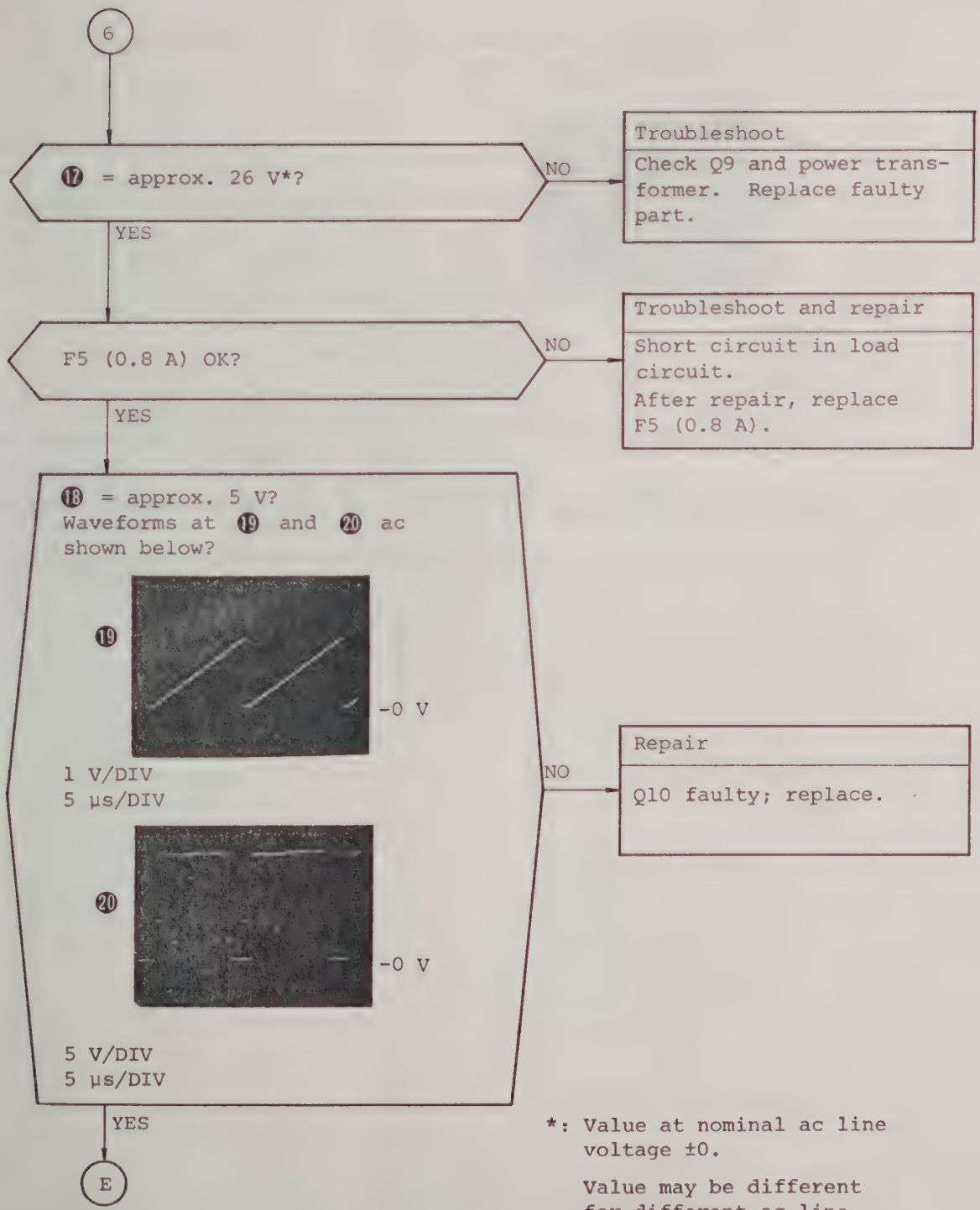

D
Waveform at ⑫ as shown below?
⑫
-0 V
5 V/DIV
5 µs/DIV
NO
Repair
A9-Q3 faulty; replace.
YES
Can voltage at ⑨ be adjusted to -5.2 ±0.2 V with A10-R30?
NO
Repair
Check Q6, Q7, Q8, L3. Replace faulty part.
YES
Adjustment
A10-R30 (paragraph 3.6.2(4))
12

[-4.5 VD line troubleshooting]



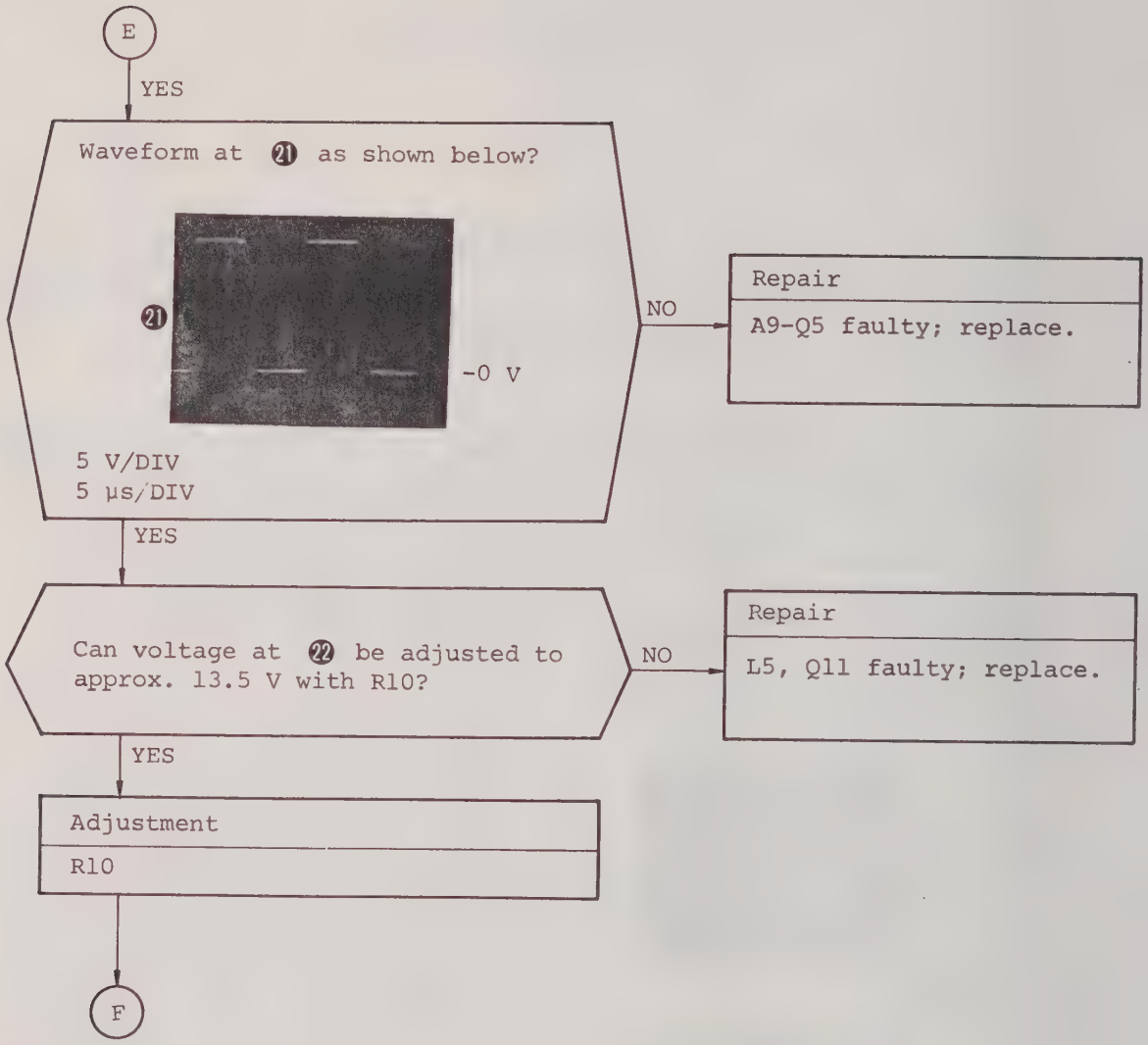
*: Value at nominal ac line voltage ±0%.
Value may be different for different ac line voltage

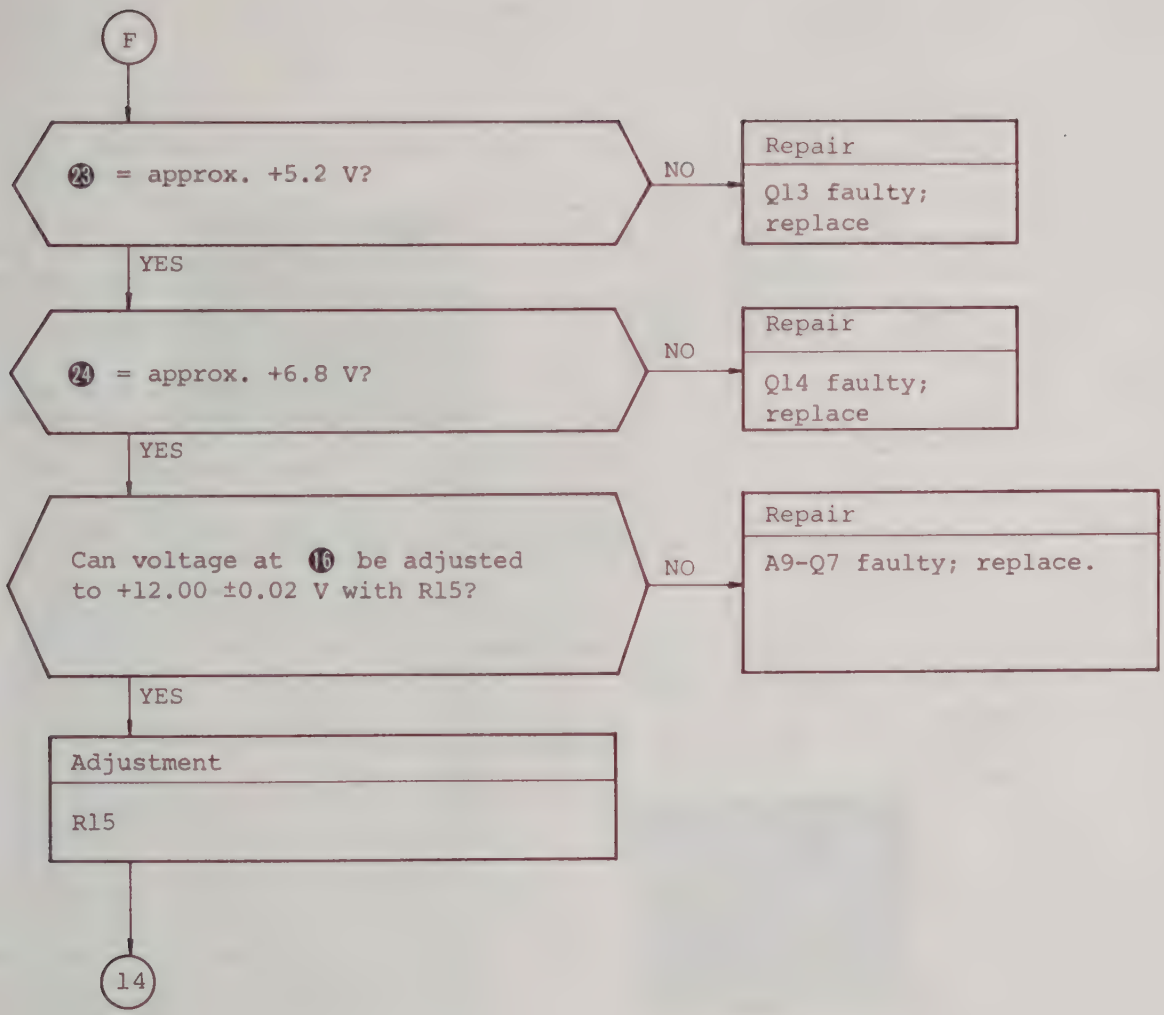
[+12 VA line troubleshooting]



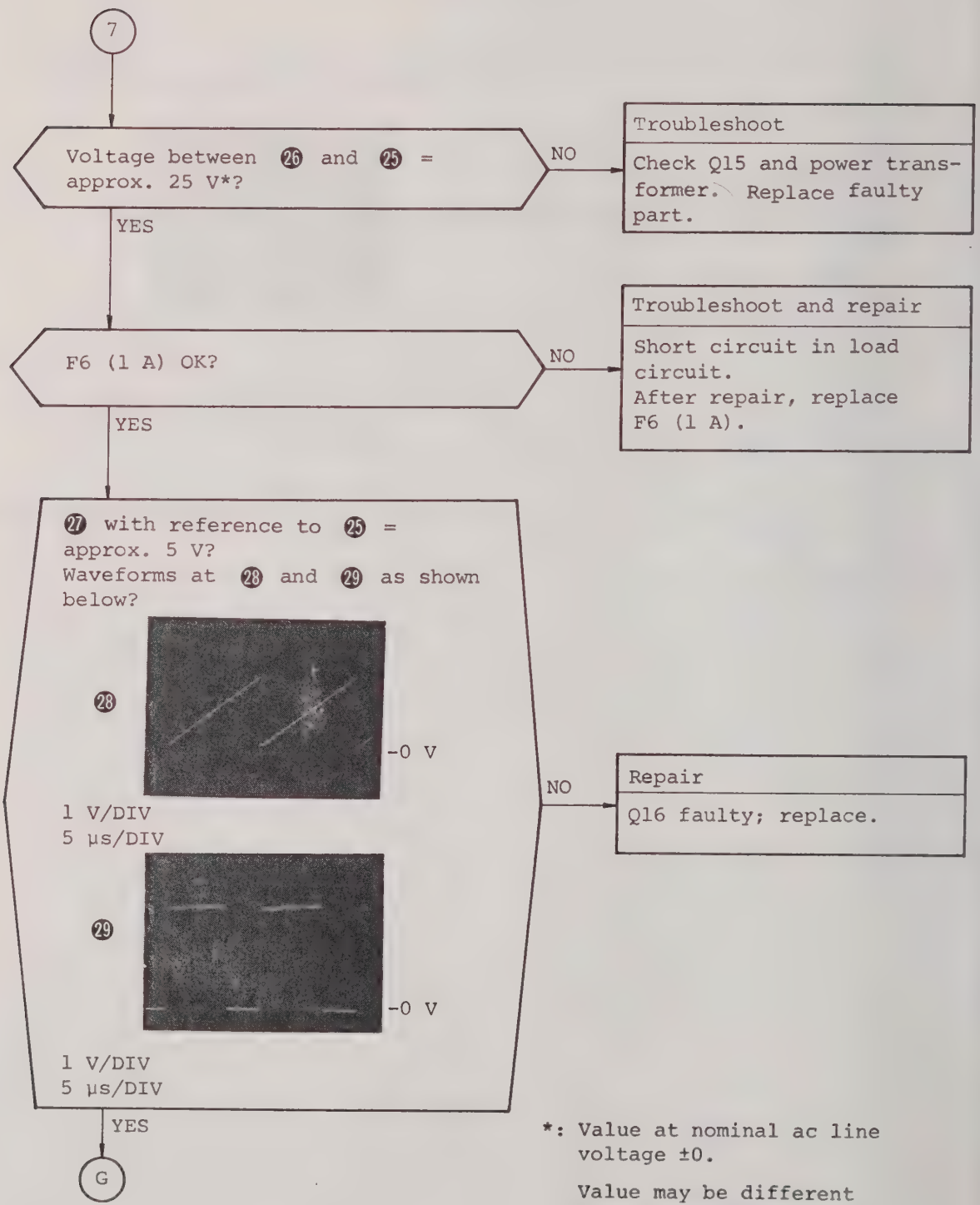
*: Value at nominal ac line voltage ±0.

Value may be different for different ac line voltage


E
YES
Waveform at ㉑ as shown below?
㉑
-0 V
5 V/DIV
5 µs/DIV
NO
Repair
A9-Q5 faulty; replace.
YES
Can voltage at ㉒ be adjusted to approx. 13.5 V with R10?
NO
Repair
L5, Q11 faulty; replace.
YES
Adjustment
R10
F

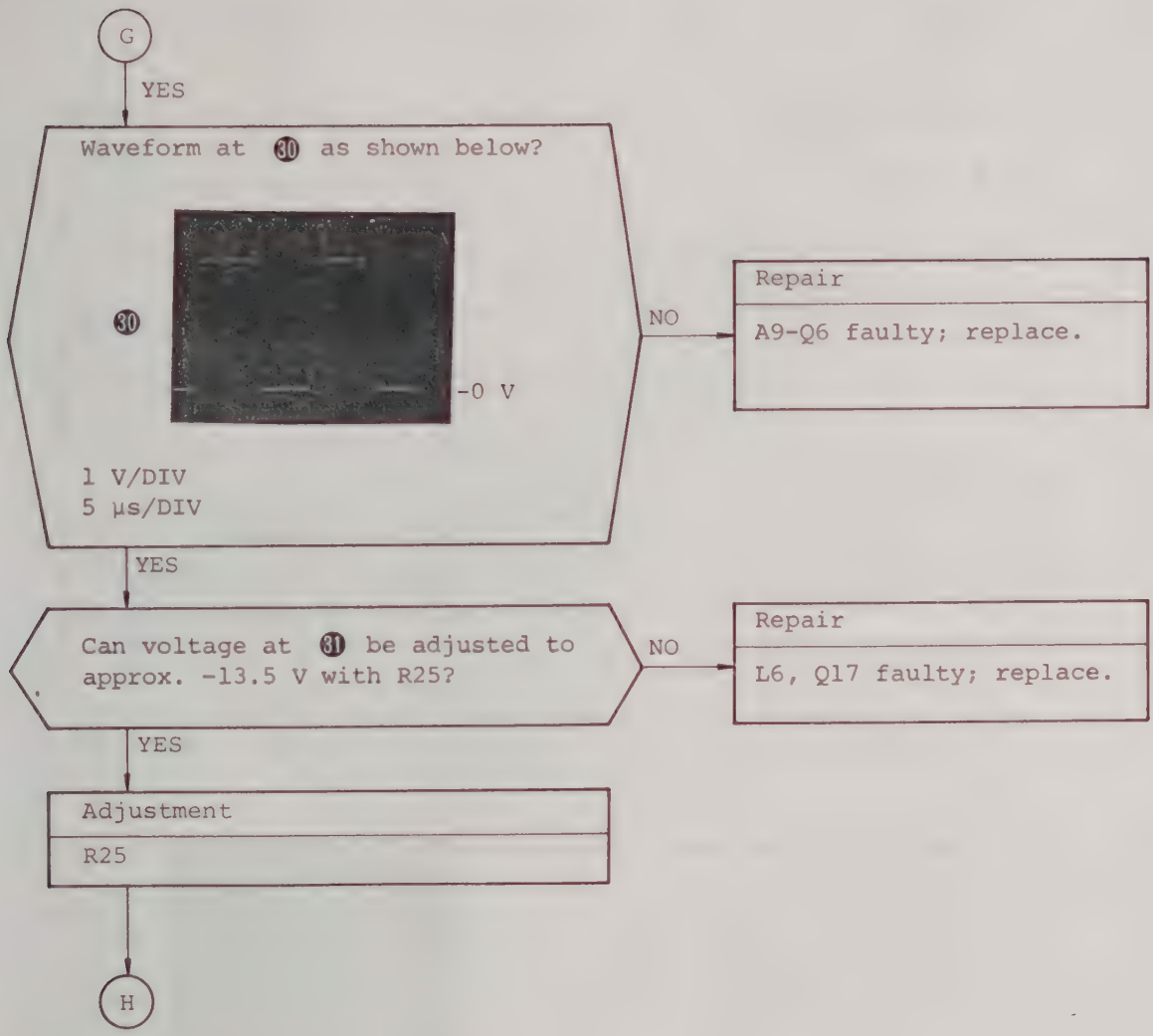

F
㉓ = approx. +5.2 V?
NO
Repair
Q13 faulty; replace
YES
㉔ = approx. +6.8 V?
NO
Repair
Q14 faulty; replace
YES
Can voltage at ⑯ be adjusted to +12.00 ±0.02 V with R15?
NO
Repair
A9-Q7 faulty; replace.
YES
Adjustment
R15
14

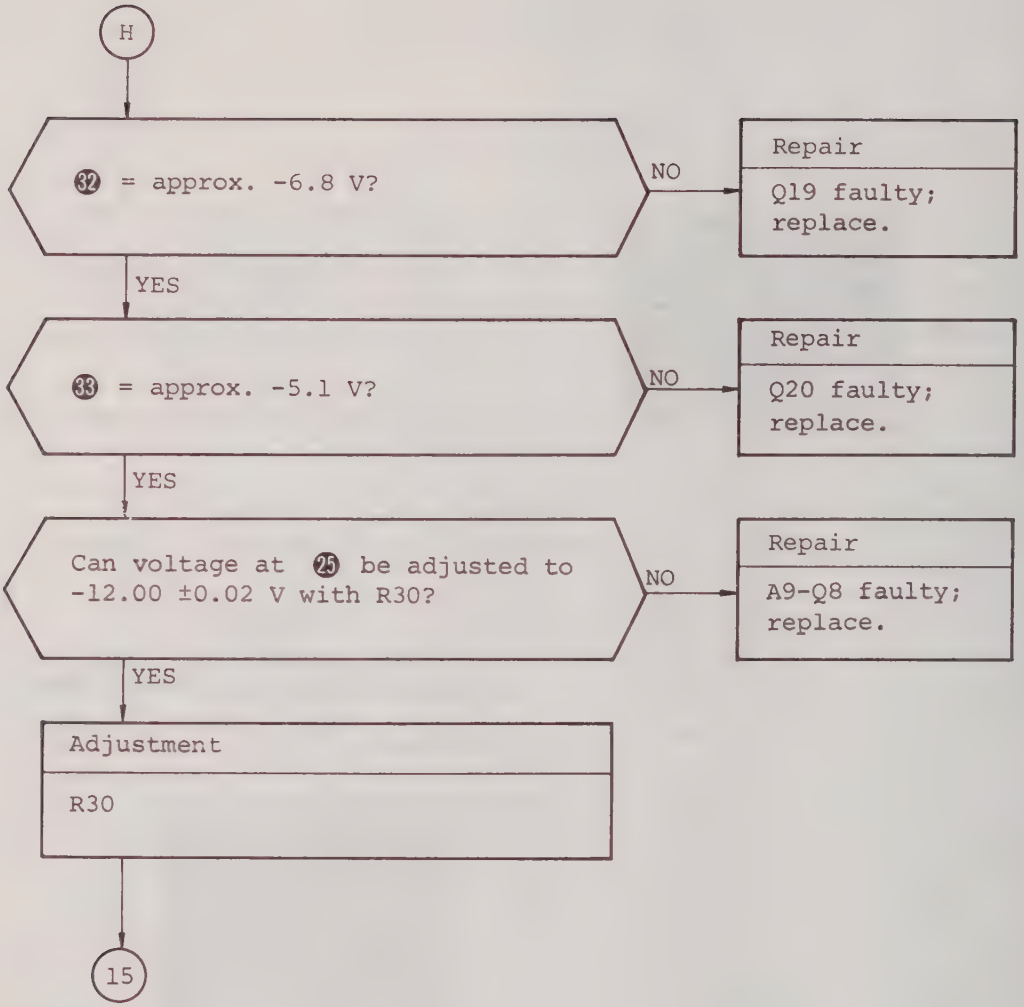
[-12 VA line troubleshooting]



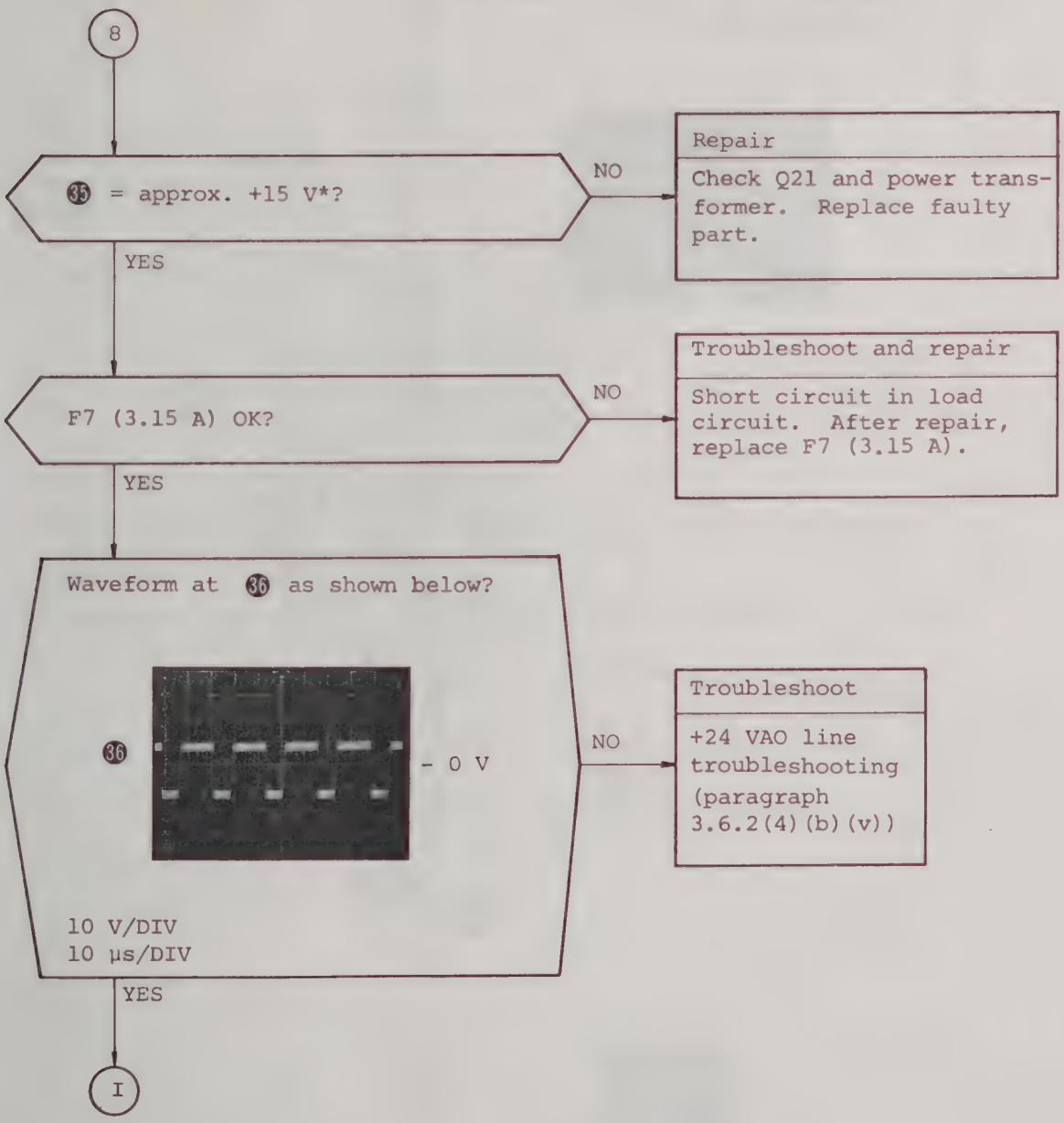
*: Value at nominal ac line voltage ±0.

Value may be different for different ac line voltage

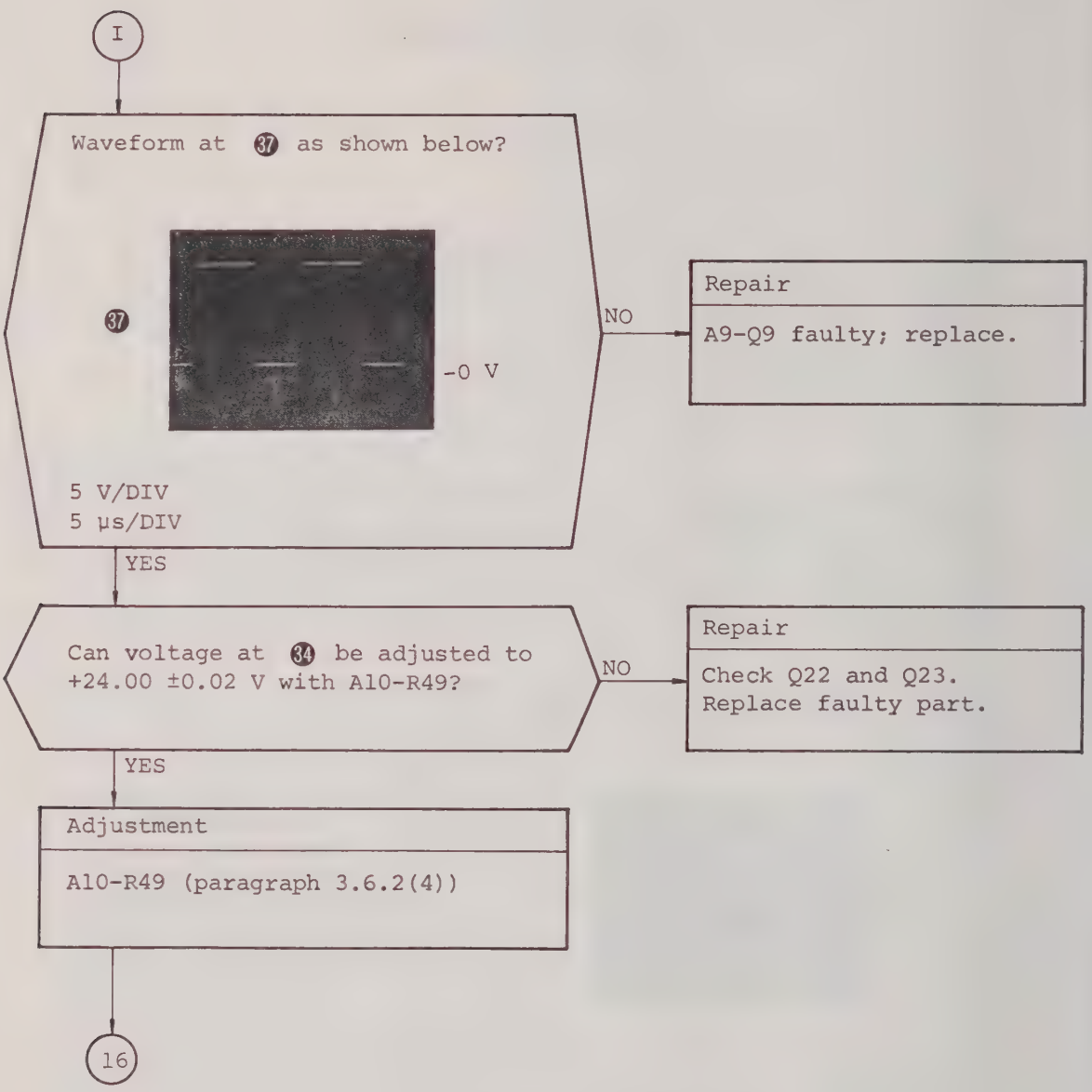

G
YES
Waveform at ㉚ as shown below?
㉚
-0 V
1 V/DIV
5 µs/DIV
NO
Repair
A9-Q6 faulty; replace.
YES
Can voltage at ㉛ be adjusted to approx. -13.5 V with R25?
NO
Repair
L6, Q17 faulty; replace.
YES
Adjustment
R25
H


H
㉜ = approx. -6.8 V?
NO
Repair
Q19 faulty; replace.
YES
㉝ = approx. -5.1 V?
NO
Repair
Q20 faulty; replace.
YES
Can voltage at ㉕ be adjusted to -12.00 ±0.02 V with R30?
NO
Repair
A9-Q8 faulty; replace.
YES
Adjustment
R30
15

[+24 VAO line troubleshooting]



*: Value at nominal ac line voltage ±0%.
Value may be different for different ac line voltage


I
Waveform at ㊲ as shown below?
㊲
-0 V
5 V/DIV
5 µs/DIV
NO
Repair
A9-Q9 faulty; replace.
YES
Can voltage at ㉞ be adjusted to +24.00 ±0.02 V with A10-R49?
NO
Repair
Check Q22 and Q23.
Replace faulty part.
YES
Adjustment
A10-R49 (paragraph 3.6.2(4))
16

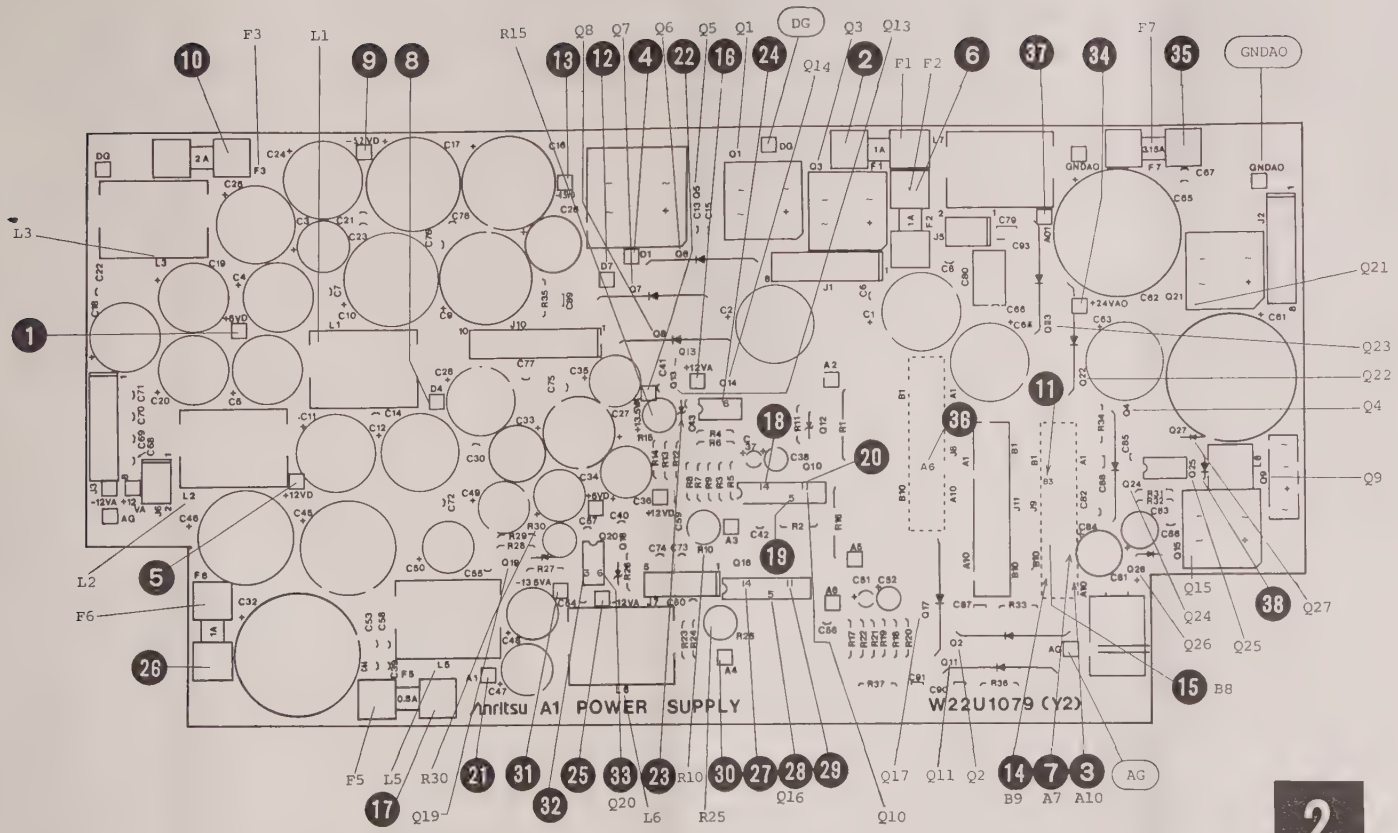
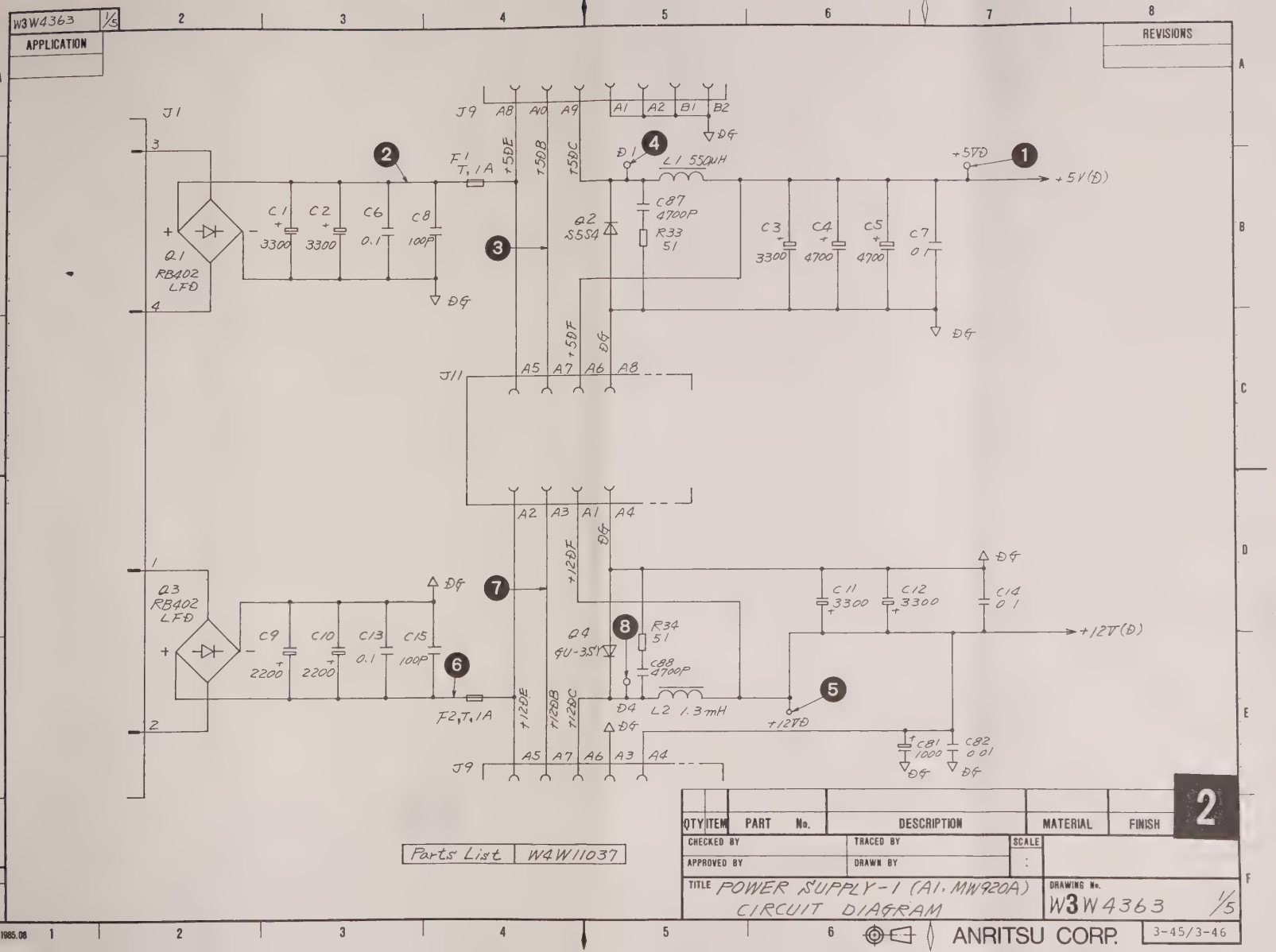
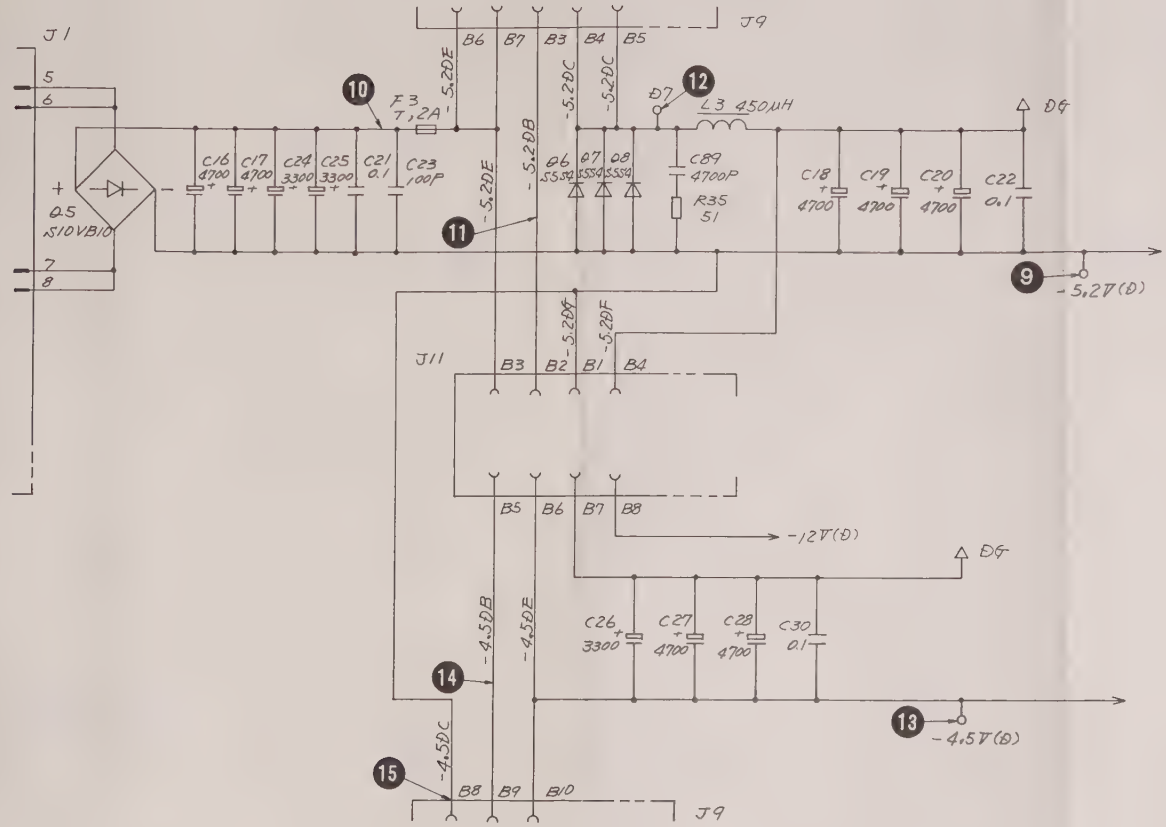


Fig. 3-3 A1 POWER SUPPLY PC Board
Parts Layout - Front Side


W3W4363 1/5
APPLICATION
REVISIONS
J1
J9
J11
F1 T, 1A
F2, T, 1A
D1
D4
L1 550uH
L2 1.3mH
Q1 RB402 LFD
Q2 SS54
Q3 RB402 LFD
Q4 GU-35T
C1 3300
C2 3300
C6 0.1
C8 100P
C87 4700P
R33 51
C3 3300
C4 4700
C5 4700
C7 0.1
C9 2200
C10 2200
C13 0.1
C15 100P
R34 51
C88 4700P
C11 3300
C12 3300
C14 0.1
C81 1000
C82 0.01
+5VD
+5V(D)
+12VD
+12V(D)
DG
Parts List W4W11037
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE
TITLE POWER SUPPLY-1 (A1, MW920A) CIRCUIT DIAGRAM
DRAWING No. W3W4363 1/5
ANRITSU CORP.
3-45/3-46
DEP
No. 0023-1985.08

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

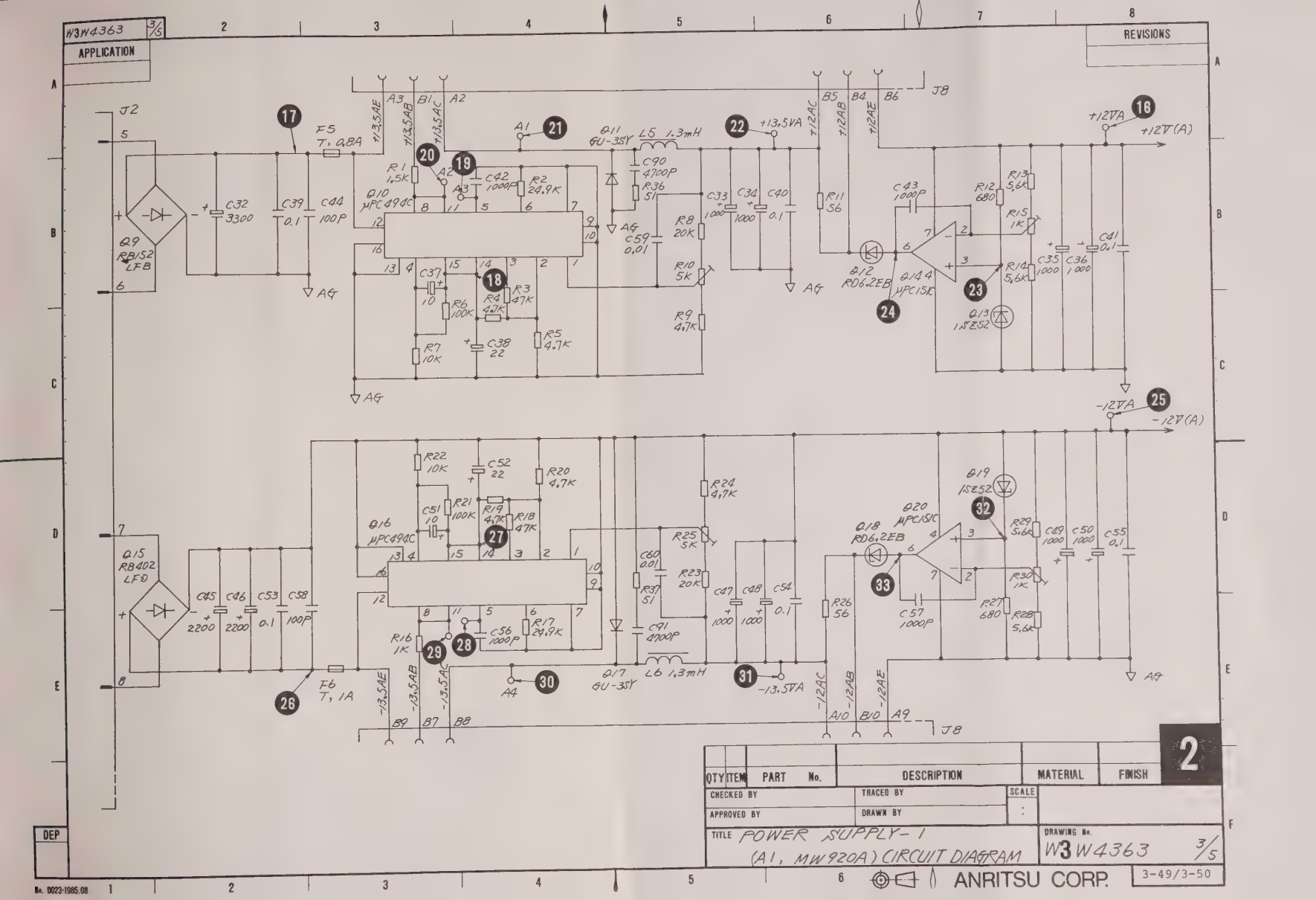
2

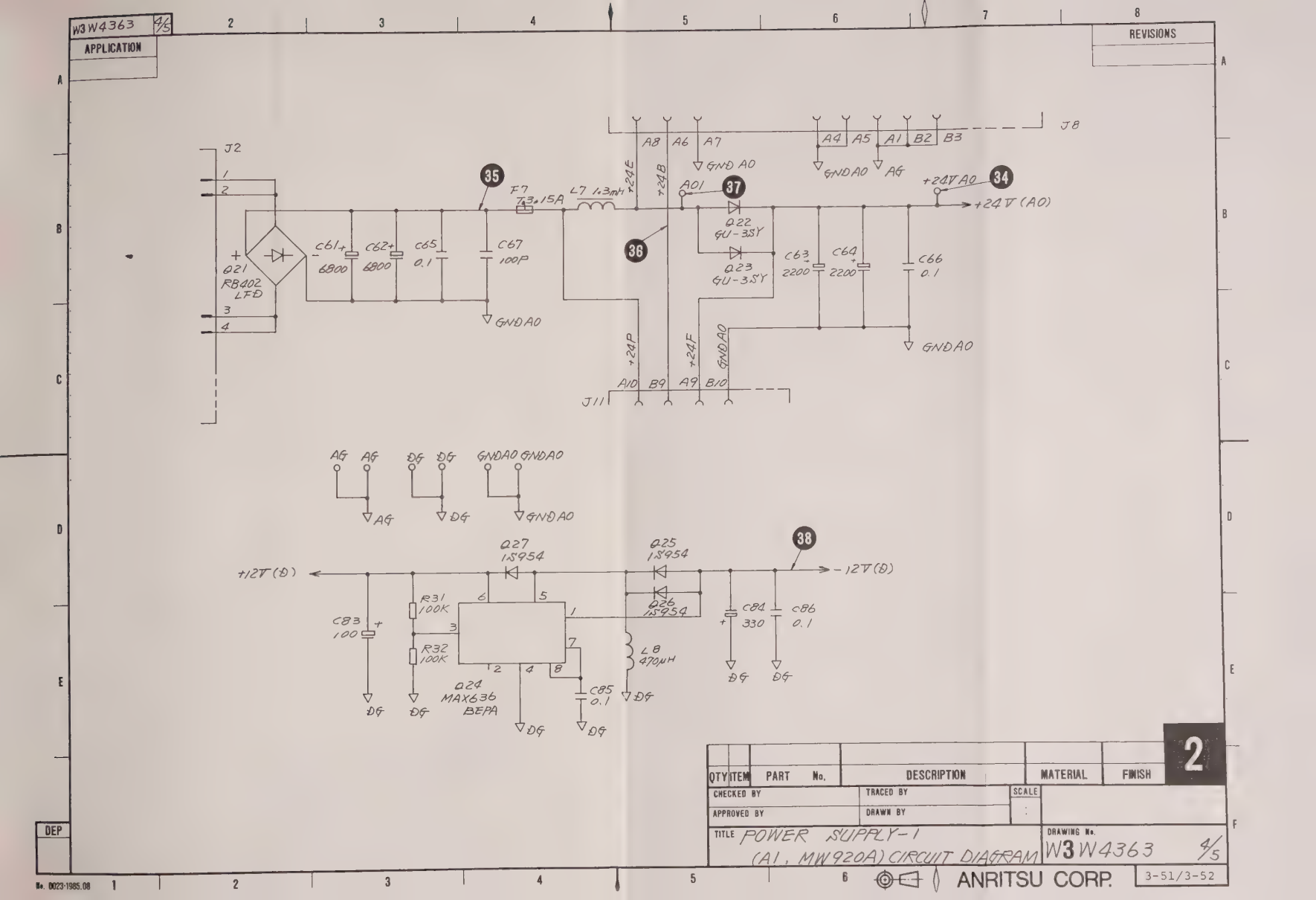
CHECKED BY	TRACED BY	SCALE :
APPROVED BY	DRAWN BY	

TITLE POWER SUPPLY-1 (A1 MW920A) CIRCUIT DIAGRAM

DRAWING No. W3W4363 2/5

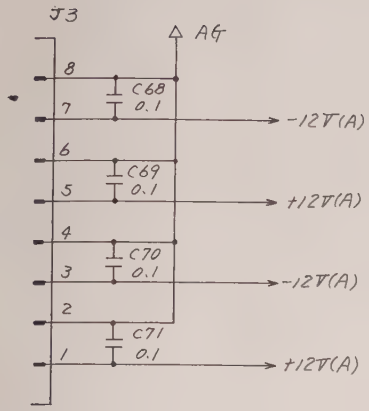
DEP

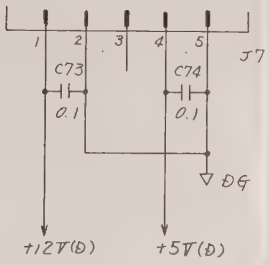

W3W4363 3/5
APPLICATION
REVISIONS
J2
J8
F5 T, 0.8A
F6 T, 1A
Q9 RBI52 LFB
Q15 RB402 LFD
Q10 μPC494C
Q16 μPC494C
Q11 GU-35Y
Q17 GU-35Y
L5 1.3mH
L6 1.3mH
Q12 RD6.2EB
Q18 RD6.2EB
Q14 μPC151C
Q20 μPC151C
Q13 1SZ52
Q19 1SZ52
+13.5AE
+13.5AB
+13.5AC
+13.5VA
+12AC
+12AB
+12AE
+12VA
+12V(A)
-12VA
-12V(A)
-13.5AE
-13.5AB
-13.5AC
-13.5VA
-12AC
-12AB
-12AE
AG
A1
A2
A3
A4
A9
A10
B1
B2
B4
B5
B6
B7
B8
B9
B10
C32 3300
C39 0.1
C44 100P
C45 2200
C46 2200
C53 0.1
C58 100P
C37 10
C38 22
C42 1000P
C51 10
C52 22
C56 1000P
C57 1000P
C60 0.01
C90 4700P
C91 4700P
C59 0.01
C33 1000
C34 1000
C40 0.1
C43 1000P
C35 1000
C36 1000
C41 0.1
C47 1000
C48 1000
C54 0.1
C49 1000
C50 1000
C55 0.1
R1 1.5K
R2 24.9K
R3 47K
R4 4.7K
R5 4.7K
R6 100K
R7 10K
R8 20K
R9 4.7K
R10 5K
R11 56
R12 680
R13 5.6K
R14 5.6K
R15 1K
R16 1K
R17 24.9K
R18 47K
R19 4.7K
R20 4.7K
R21 100K
R22 10K
R23 20K
R24 4.7K
R25 5K
R26 56
R27 680
R28 5.6K
R29 5.6K
R30 1K
R36 51
R37 51
DEP
QTY ITEM PART No.
DESCRIPTION
MATERIAL
FINISH
CHECKED BY
TRACED BY
SCALE
APPROVED BY
DRAWN BY
TITLE POWER SUPPLY-1 (A1, MW920A) CIRCUIT DIAGRAM
DRAWING No. W3W4363 3/5
ANRITSU CORP.
3-49/3-50
No. 0023-1985.08

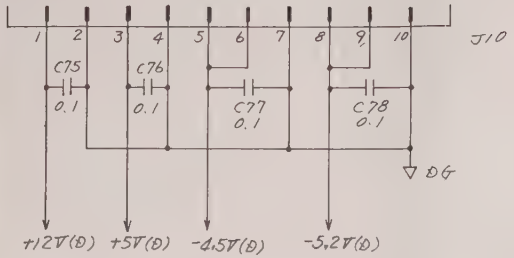

W3W4363 4/5
APPLICATION
REVISIONS
J2
J8
J11
35
36
37
38
34
F7 7A 15A
L7 1.3mH
+24E
+24B
+24P
+24F
GNDAO
AG
DG
A01
+24V AO
+24V (AO)
Q21 RB402 LFD
C61 6800
C62 6800
C65 0.1
C67 100P
Q22 GU-3SY
Q23 GU-3SY
C63 2200
C64 2200
C66 0.1
+12V(D)
-12V(D)
Q27 1S954
Q25 1S954
Q26 1S954
R31 100K
R32 100K
C83 100
Q24 MAX636 BEPA
L8 470μH
C84 330
C86 0.1
C85 0.1
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE
TITLE POWER SUPPLY-1 (A1, MW920A) CIRCUIT DIAGRAM
DRAWING No. W3W4363 4/5
ANRITSU CORP.
3-51/3-52
DEP
No. 0023-1985.08

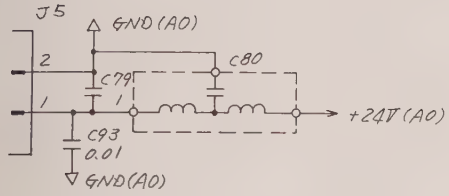
APPLICATION

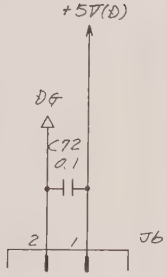
REVISIONS











QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY | TRACED BY | SCALE :

APPROVED BY | DRAWN BY

TITLE: POWER SUPPLY-1 (A1, MW920A) CIRCUIT DIAGRAM

DRAWING No. W3W4363 5/5

ANRITSU CORP. 3-53/3-54

DEP

(3) A9 POWER SUPPLY 3 10

(a) Circuit description

This PC board contains the power transistors used for all the dc power supplies except the -12 VD power supply.

The power transistor for regulation is attached to a heat sink. The heat sink is fastened with a screw to the pattern side of the PC board. However, since the +5 VD and +12 VA power transistors generate a lot of heat, they are attached to the radiator fins at the rear panel.

(b) Troubleshooting and repair

See paragraphs 3.6.2 (1), (2), and (4).

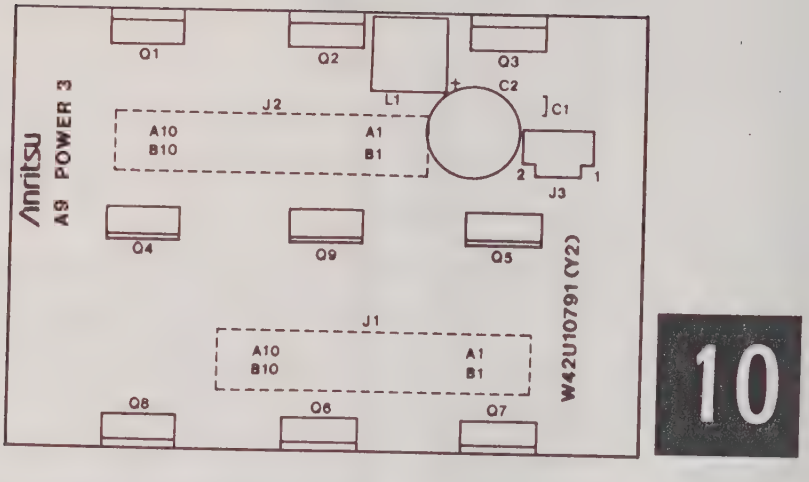
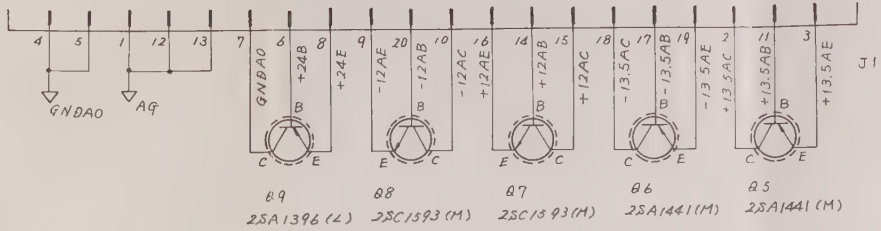


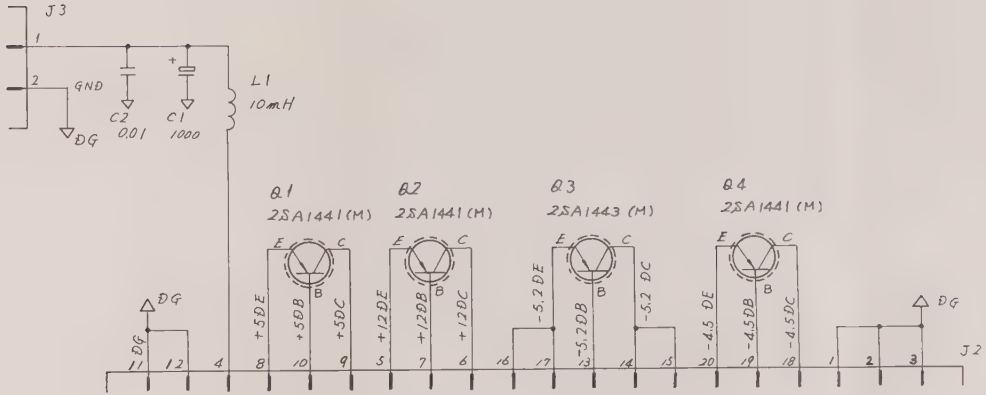
Fig. 3-4 A9 POWER SUPPLY-3 PC Board Parts Layout

W3W 4245 1/1

APPLICATION

REVISIONS





Parts List W4W10880

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY | TRACED BY | SCALE

APPROVED BY | DRAWN BY | :

TITLE POWER SUPPLY-3 (A9, MW920A)
Circuit Diagram

DRAWING No. W3W4245 1/1

10

DEP

ANRITSU CORP.

3-57/3-58

No. 0023-1985.08

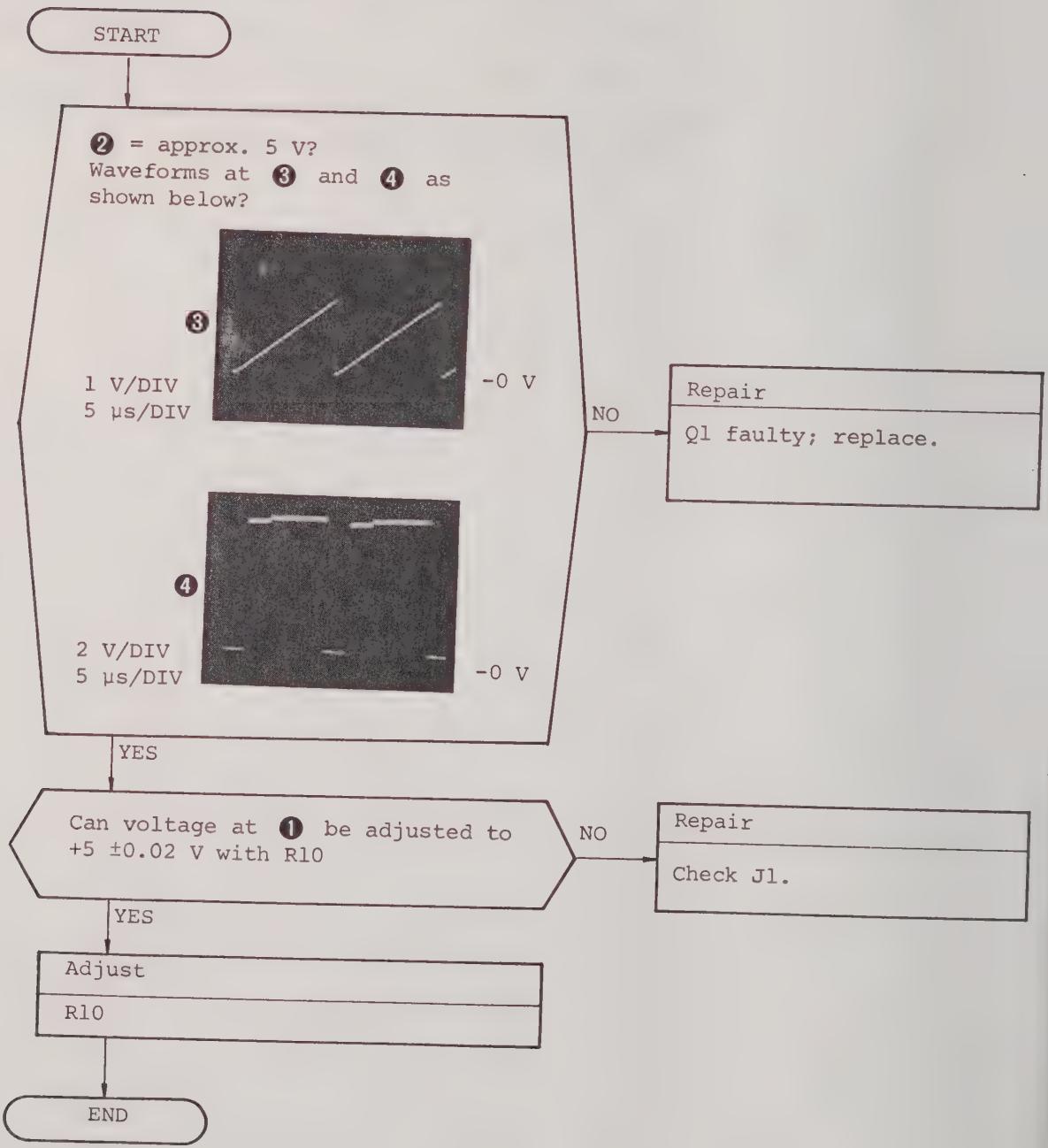
(4) A10 POWER SUPPLY 2 11

(a) Circuit description

This PC board consists of the switching regulators for the +5 VD, +12 VD, -5.2 VD, and +24 V (AO) power supplies and of the series regulator for the -4.5 VD power supply, and controls each power supply circuit.

(b) Troubleshoot and repair

(i) +5 VD line troubleshooting and repair

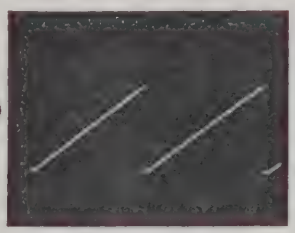


(ii) +12 VD line troubleshooting and repair

START

❻ = approx. 5 V?
Waveforms at ❼ and ❽ as shown below?

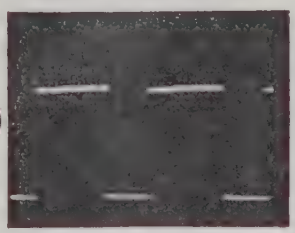
❼



-0 V

1 V/DIV
5 µs/DIV

❽



-0 V

5 V/DIV
5 µs/DIV

NO → Repair: Q2 faulty; replace.

YES

Can voltage at ❺ be adjusted to +12.00 ±0.02 V with R20?

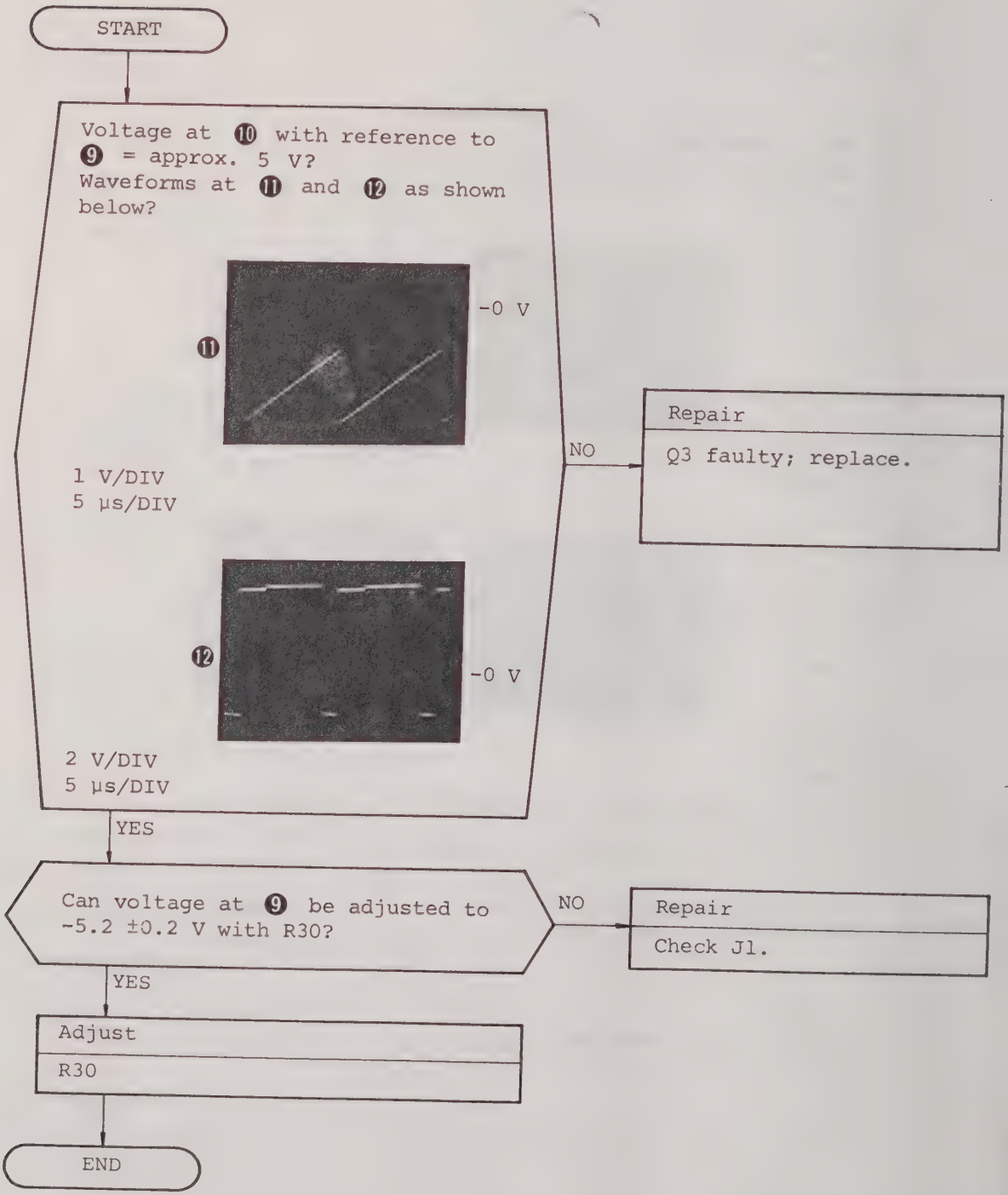
NO → Repair: Check J1.

YES

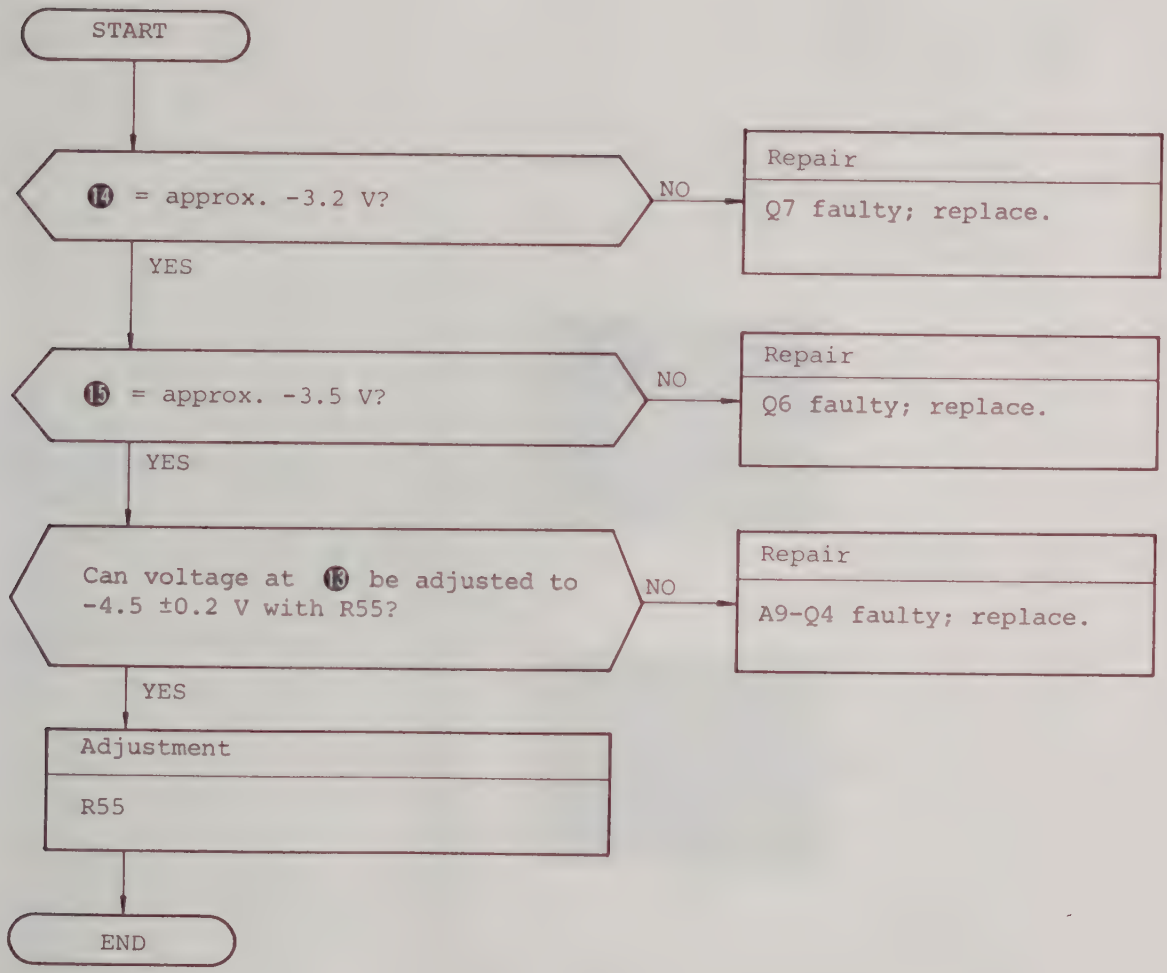
Adjust: R20

END

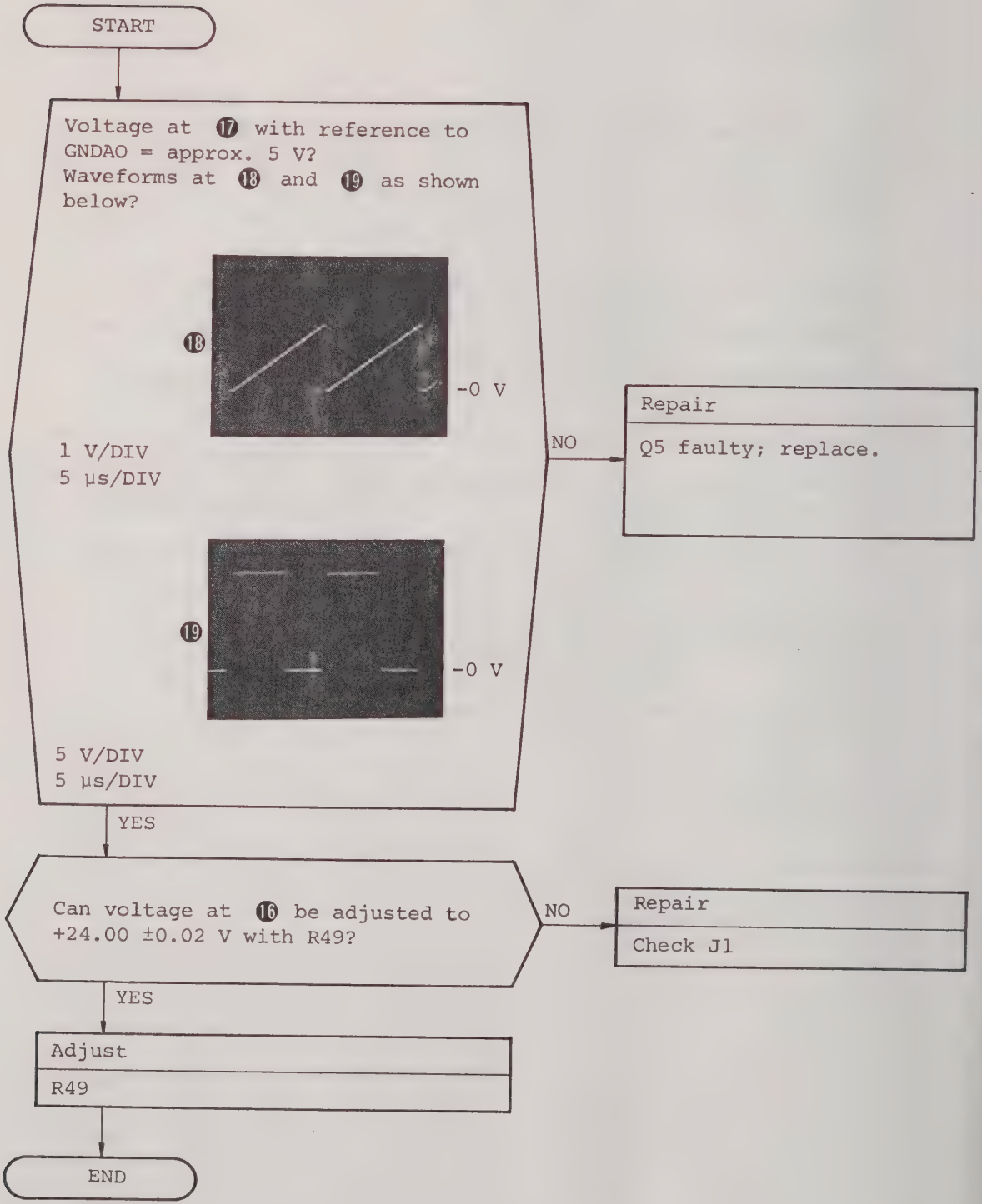
(iii) -5.2 VD line troubleshooting and repair



(iv) -4.5 VD line troubleshooting and repair



(v) +24 V (AO) line troubleshooting and repair



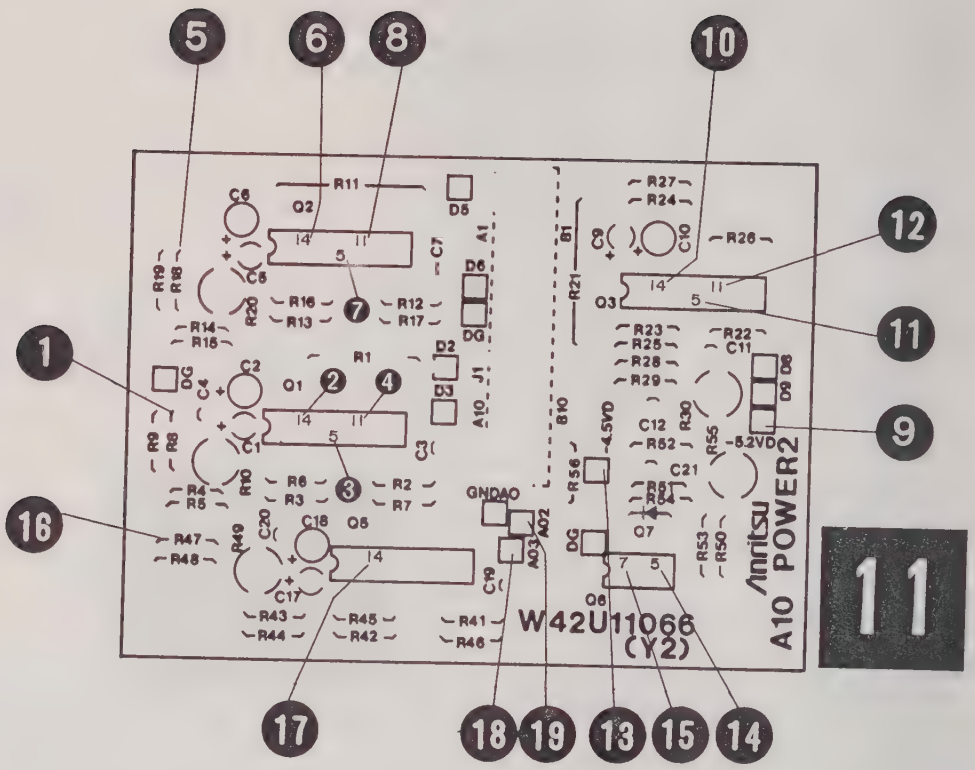
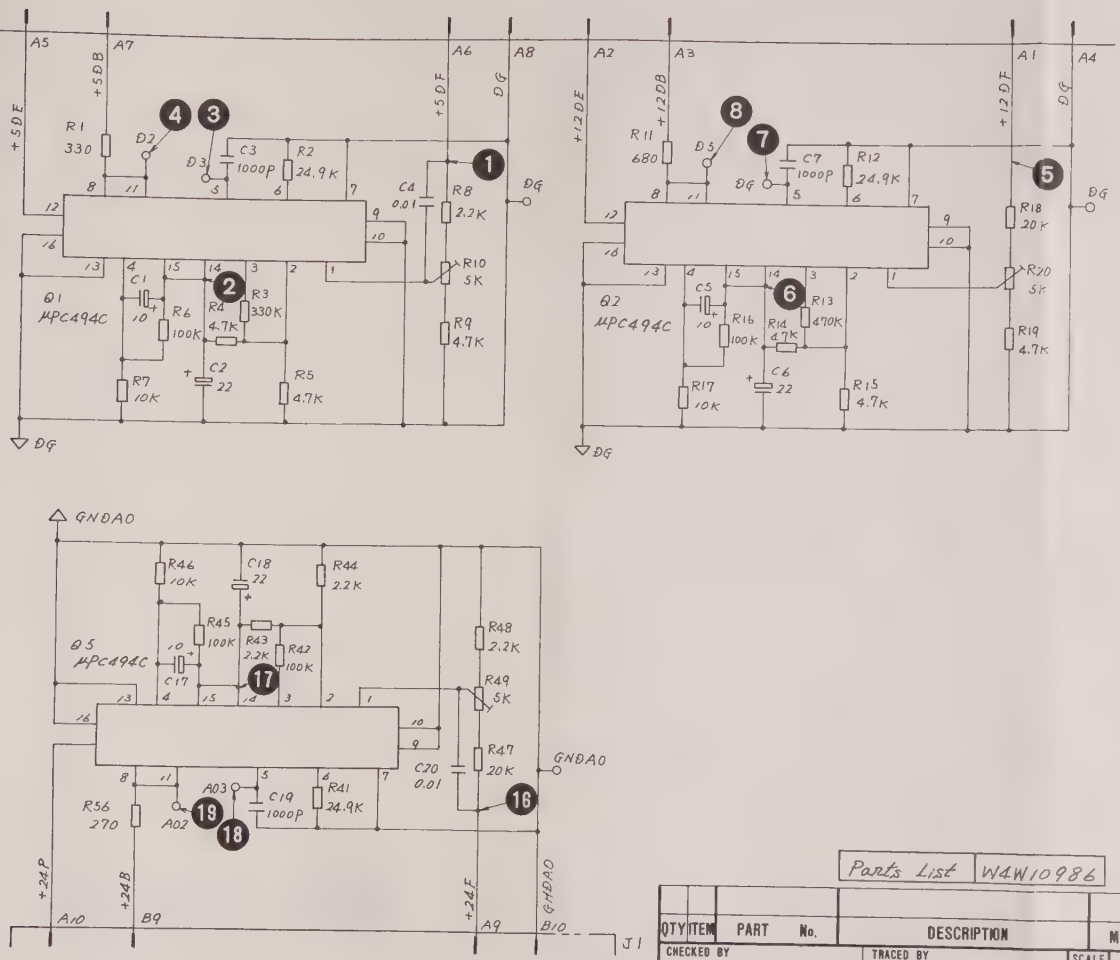


Fig. 3-5 A10 POWER SUPPLY-2 PC Board Parts Layout

W3W4301 1/2

APPLICATION

REVISIONS



Parts List W4W10986

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY	TRACED BY
APPROVED BY	DRAWN BY

SCALE

TITLE POWER SUPPLY-2 (A10, MW920A) Circuit Diagram

DRAWING No. W3W4301 1/2

ANRITSU CORP

3-67/3-68

DEP

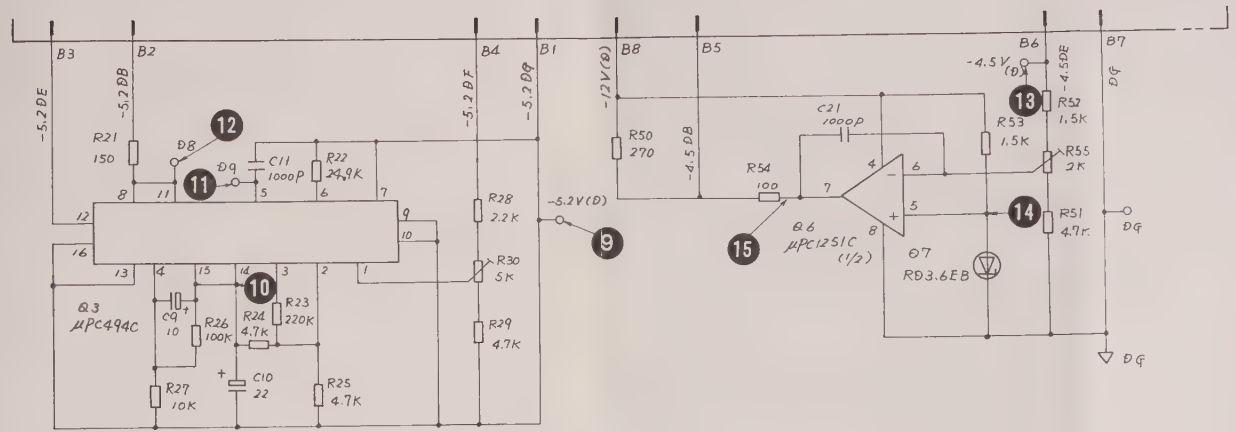
11

Rev. 0023-1985.08

W3W4301 2/2

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY | TRACED BY | SCALE : M-1

APPROVED BY | DRAWN BY

TITLE POWER SUPPLY-2 (A10, MW920A)
Circuit Diagram

DRAWING No. W3W4301 2/2

11

DEP

ANRITSU CORP.

3-69/3-70

No. 0023-1985.08

3.6.3 A2 CPU 3

(1) Circuit description

This PC board controls the exchange of data with other PC boards. It is divided into the following two blocks:

1. CPU

   This block consists of an MPU (Q1), 512 kbit CMOS ROM (Q7, Q8) and 640 kbit CMOS SRAM (Q9, Q10), and controls data input and output between blocks. The MPU clock signal is 8 MHz (X1).

2. CRT controller

   This block uses a Cathode Ray Tube Controller (CRTC) (Q21) and generates the CRT unit control signals and video out signal.

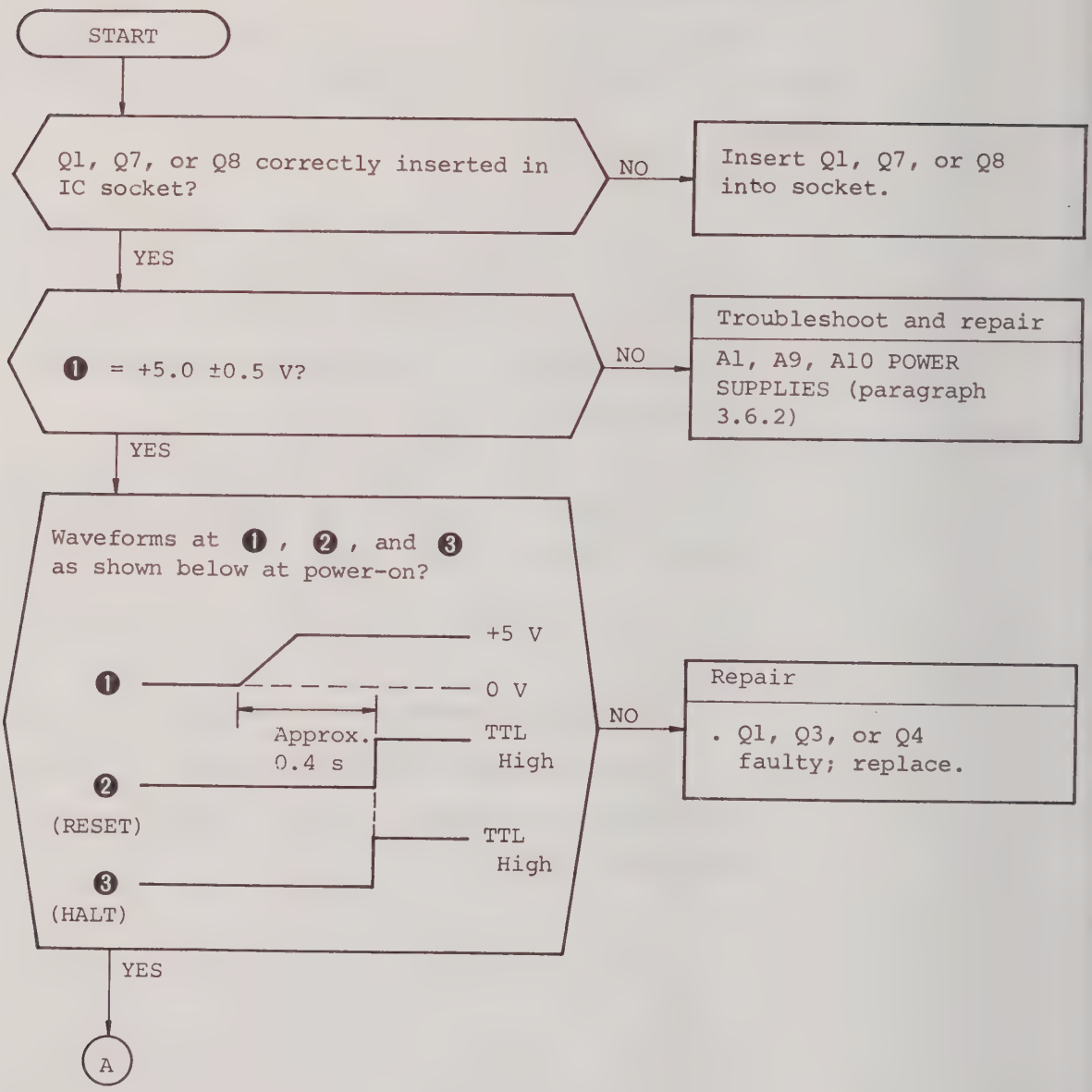
   The video out signal is a composite signal and is output at:

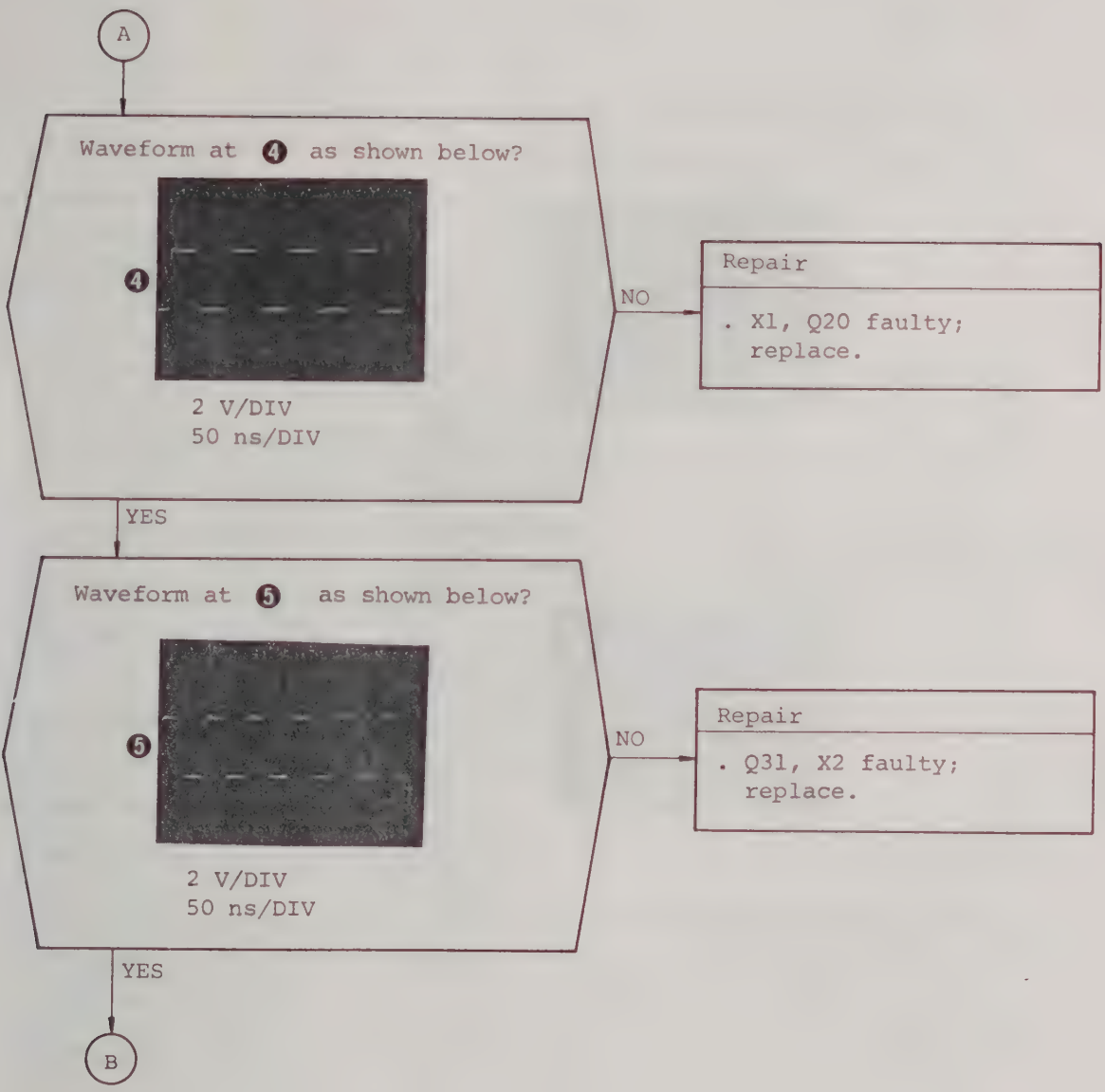
   horizontal repetition frequency: 15.6 kHz

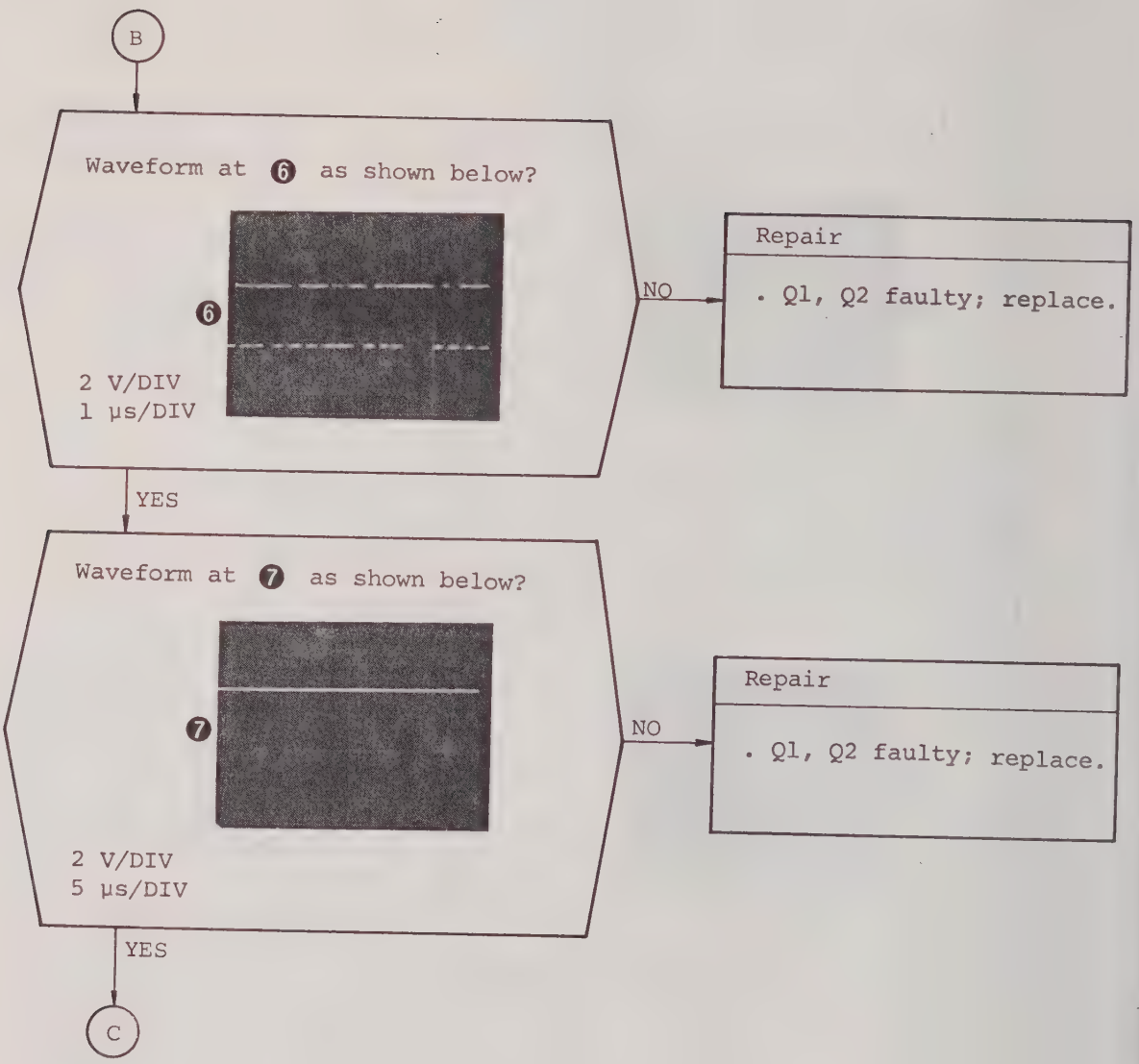
   vertical repetition frequency: 48.8 Hz

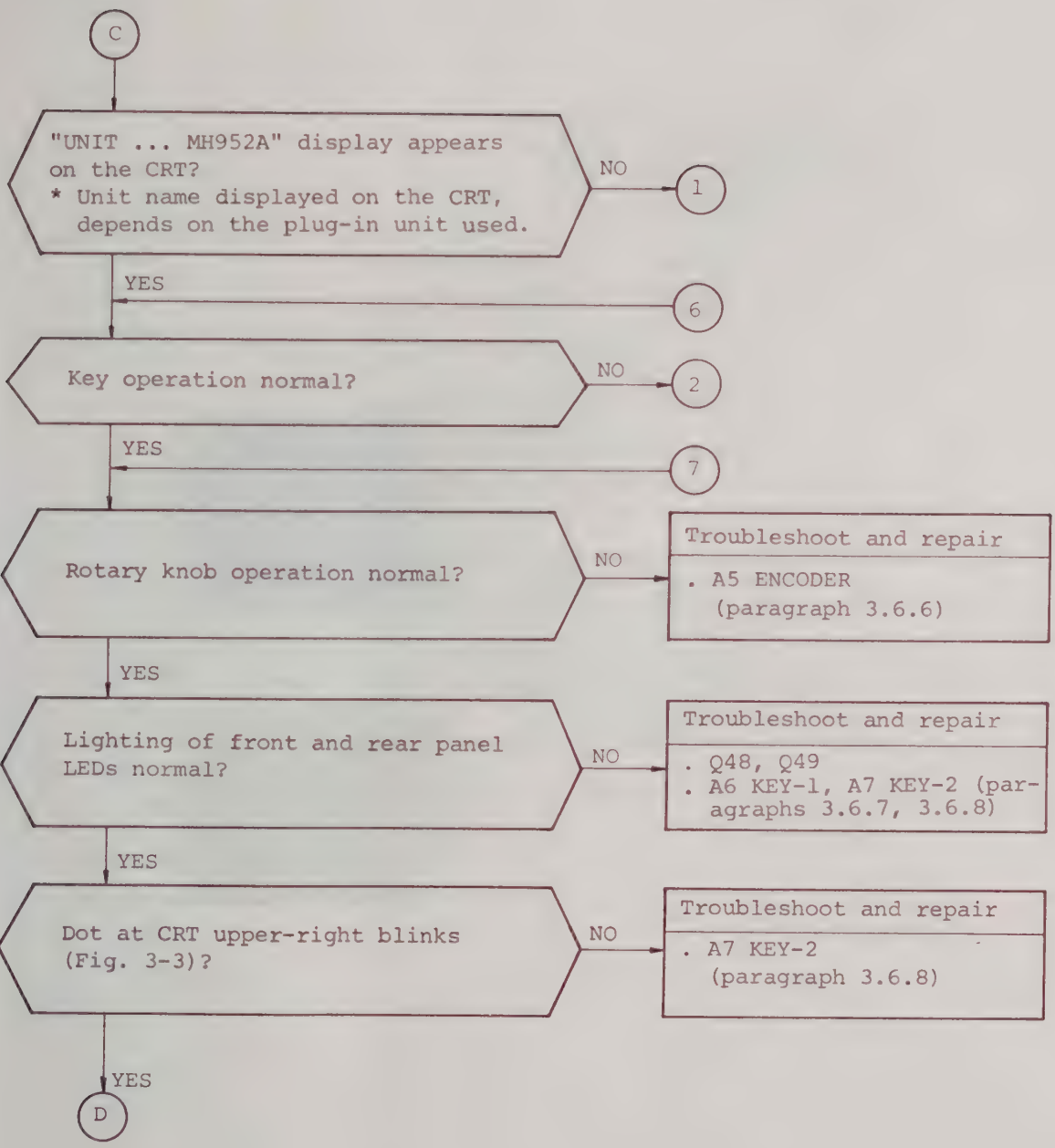
   The CRTC clock signal uses an 11 MHz crystal oscillator (X2).

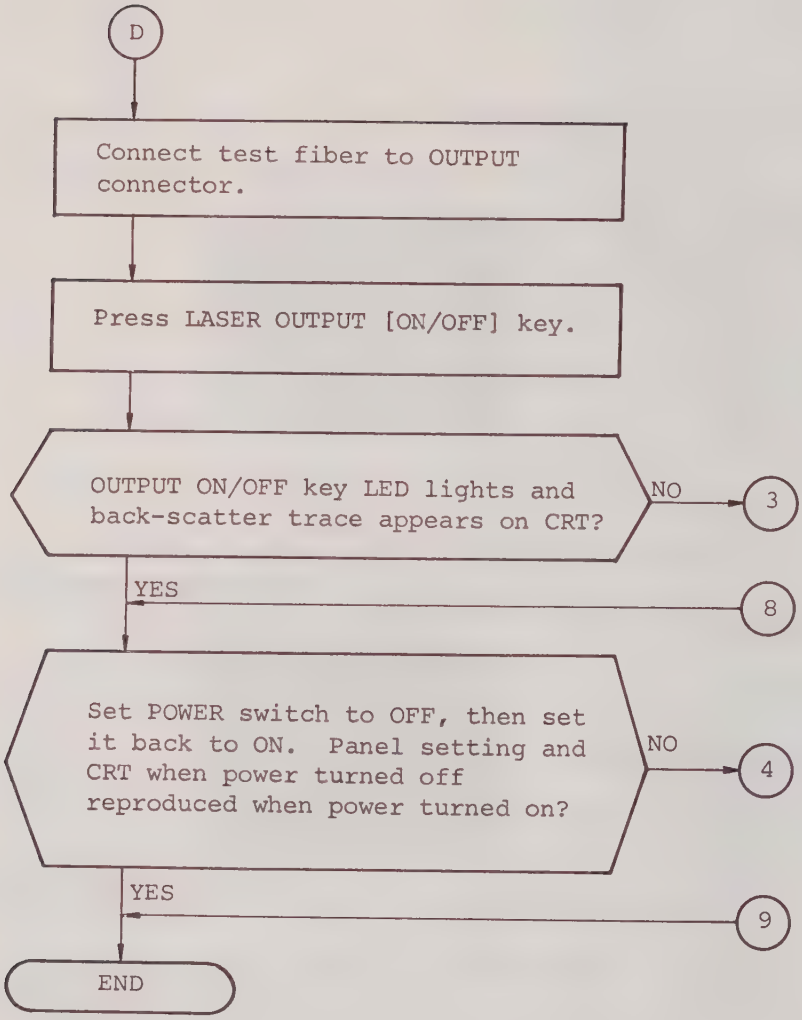
(2) Troubleshooting and repair

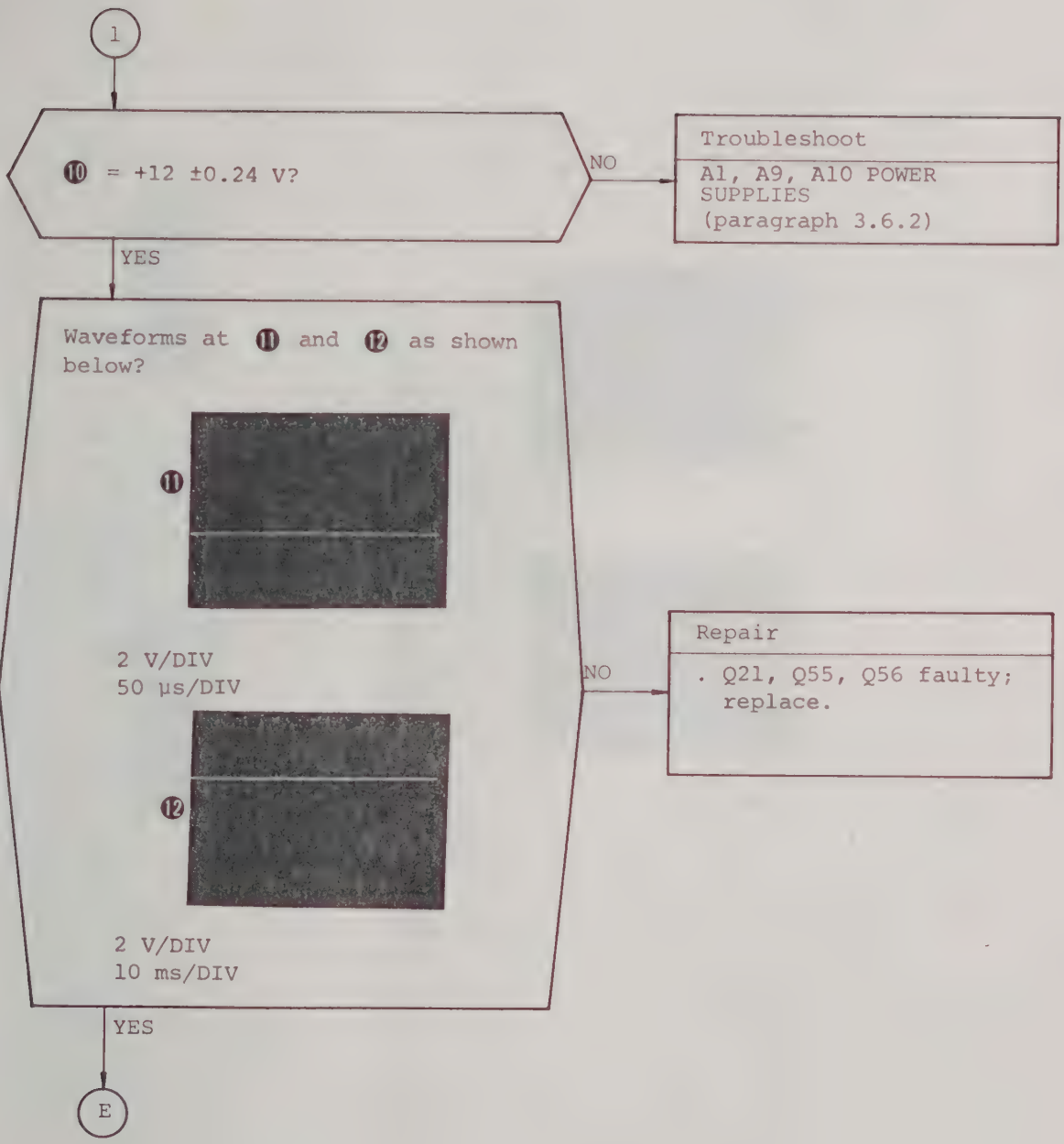


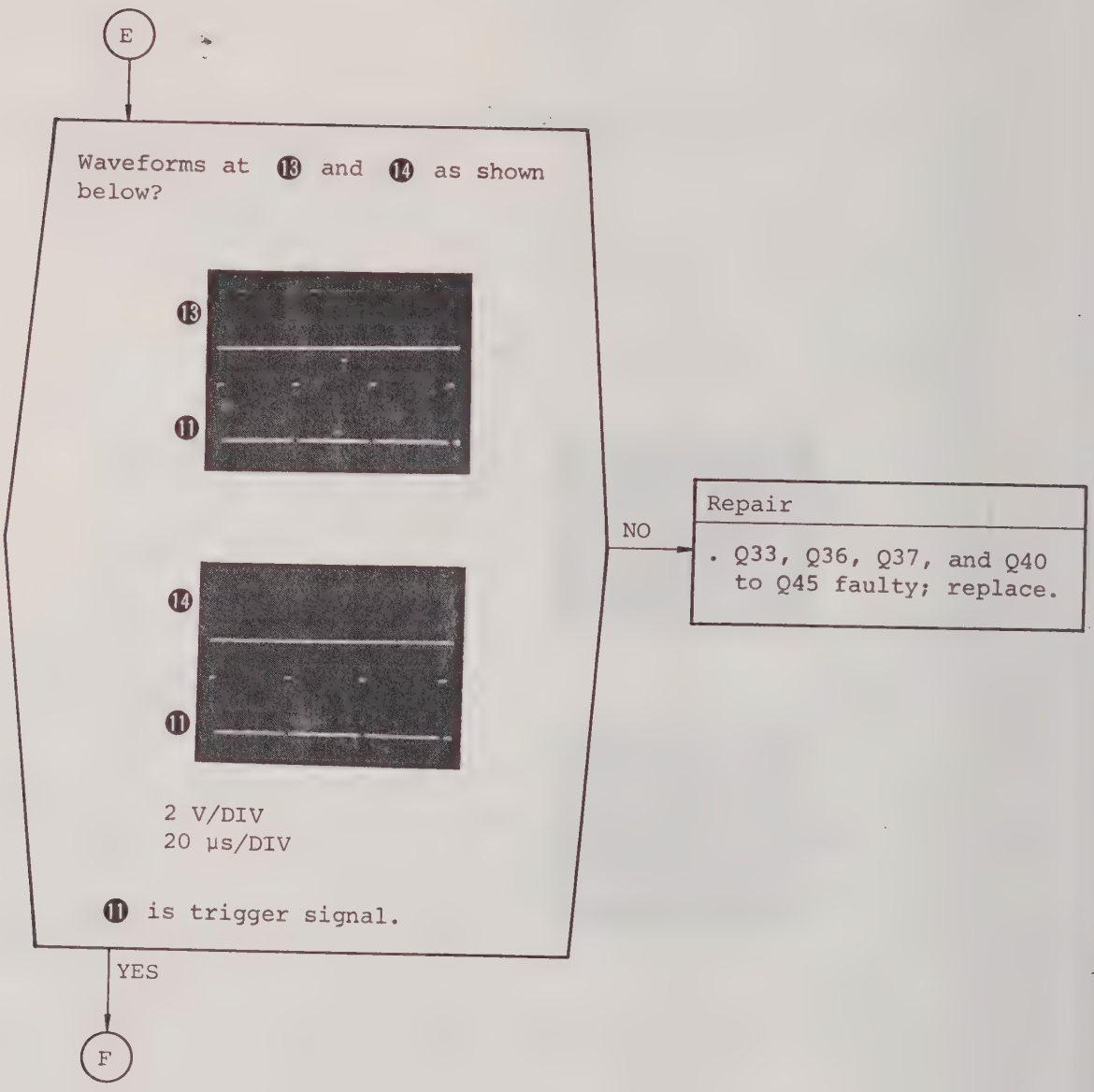

A
Waveform at ❹ as shown below?
❹
2 V/DIV
50 ns/DIV
NO
Repair
. X1, Q20 faulty;
replace.
YES
Waveform at ❺ as shown below?
❺
2 V/DIV
50 ns/DIV
NO
Repair
. Q31, X2 faulty;
replace.
YES
B

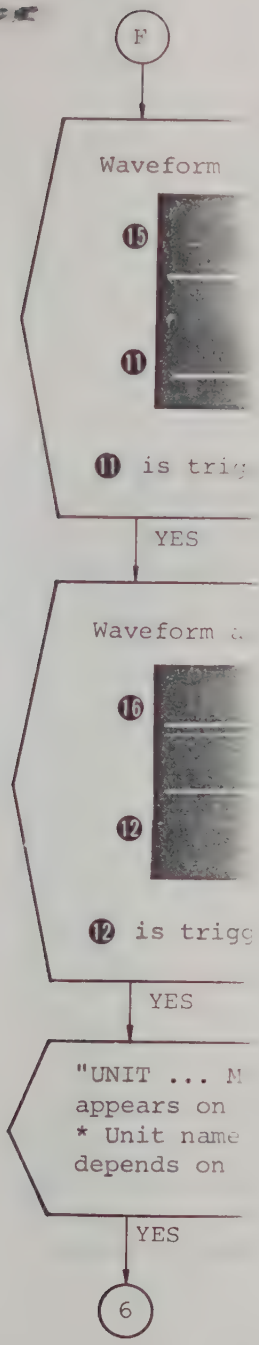

B
Waveform at ❻ as shown below?
❻
2 V/DIV
1 µs/DIV
NO
Repair
· Q1, Q2 faulty; replace.
YES
Waveform at ❼ as shown below?
❼
2 V/DIV
5 µs/DIV
NO
Repair
· Q1, Q2 faulty; replace.
YES
C


C
"UNIT ... MH952A" display appears on the CRT?
* Unit name displayed on the CRT, depends on the plug-in unit used.
NO
1
YES
6
Key operation normal?
NO
2
YES
7
Rotary knob operation normal?
NO
Troubleshoot and repair
. A5 ENCODER (paragraph 3.6.6)
YES
Lighting of front and rear panel LEDs normal?
NO
Troubleshoot and repair
. Q48, Q49
. A6 KEY-1, A7 KEY-2 (paragraphs 3.6.7, 3.6.8)
YES
Dot at CRT upper-right blinks (Fig. 3-3)?
NO
Troubleshoot and repair
. A7 KEY-2 (paragraph 3.6.8)
YES
D


D
Connect test fiber to OUTPUT connector.
Press LASER OUTPUT [ON/OFF] key.
OUTPUT ON/OFF key LED lights and back-scatter trace appears on CRT?
NO
3
YES
8
Set POWER switch to OFF, then set it back to ON. Panel setting and CRT when power turned off reproduced when power turned on?
NO
4
YES
9
END


1
⑩ = +12 ±0.24 V?
NO
Troubleshoot
A1, A9, A10 POWER SUPPLIES
(paragraph 3.6.2)
YES
Waveforms at ⑪ and ⑫ as shown below?
⑪
2 V/DIV
50 µs/DIV
⑫
2 V/DIV
10 ms/DIV
NO
Repair
. Q21, Q55, Q56 faulty; replace.
YES
E


E
Waveforms at ⓭ and ⓮ as shown below?
⓭
⓫
⓮
⓫
2 V/DIV
20 µs/DIV
⓫ is trigger signal.
NO
Repair
· Q33, Q36, Q37, and Q40 to Q45 faulty; replace.
YES
F



NO

Repair
. Q54, Q56, Q59 faulty; replace.

NO

Repair
. Q54, Q57, Q60 faulty; replace.

NO

Troubleshoot and repair
. A7 KEY-2 (paragraph 3.6.8)

2

When front panel keys pressed, does voltage level of test point corresponding to key become CMOS low level?
(For the relationship between the keys and test points, see Table 3-8.)

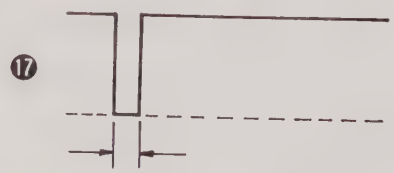
Table 3-8 Relationship between Front Panel Keys, A2 Test Points, and A2 Signal Names.

Front Panel Key	A2 CPU PC Board Test Point	Signal Name
GP-IB / SPLICE	⑳	PD0
LD / LOSS	㉑	PD1
MARKER / LSA	㉒	PD2
V-SHIFT / 2PA	㉓	PD3
H-SHIFT / ON	㉔	PD4
COARSE / OFF	㉕	PD5

NO → Troubleshoot and repair
. A6 KEY-1 (paragraph 3.6.7)

YES

When front panel keys pressed, does waveform shown below appears at ⑰ ?



NO → Repair
. A6-Q1 faulty; replace.

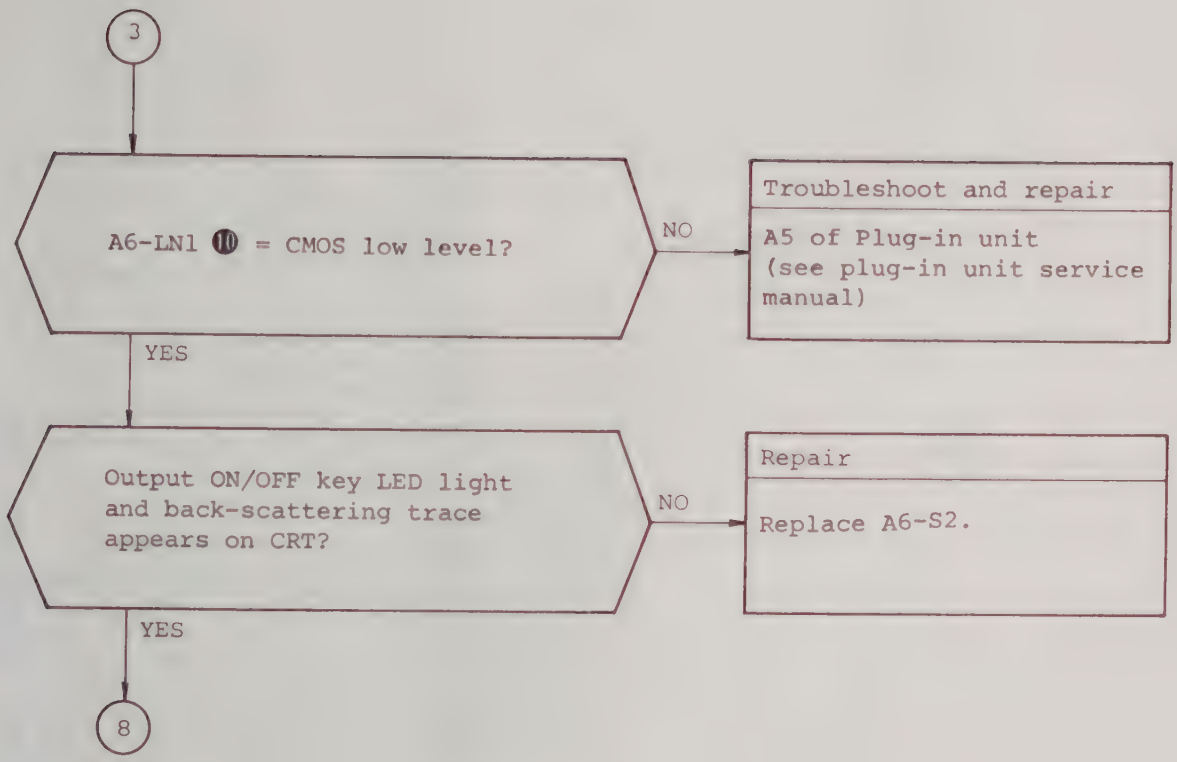
YES

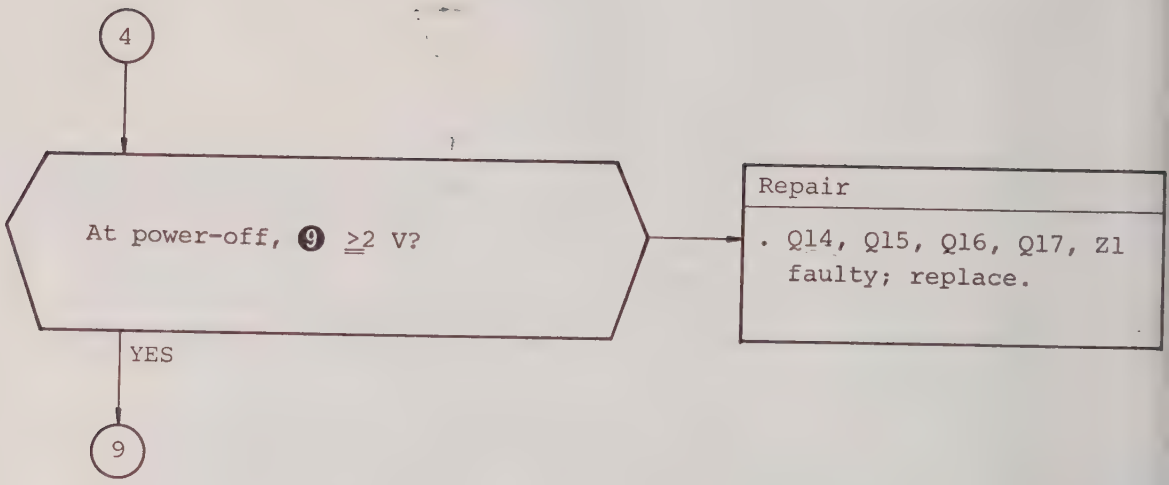
Key operation normal?

NO → Repair
. Q1, Q2 faulty; replace.

YES

7


3
A6-LN1 ⑩ = CMOS low level?
NO
Troubleshoot and repair
A5 of Plug-in unit
(see plug-in unit service
manual)
YES
Output ON/OFF key LED light
and back-scattering trace
appears on CRT?
NO
Repair
Replace A6-S2.
YES
8


4
At power-off, ❾ ≧2 V?
YES
9
Repair
· Q14, Q15, Q16, Q17, Z1 faulty; replace.

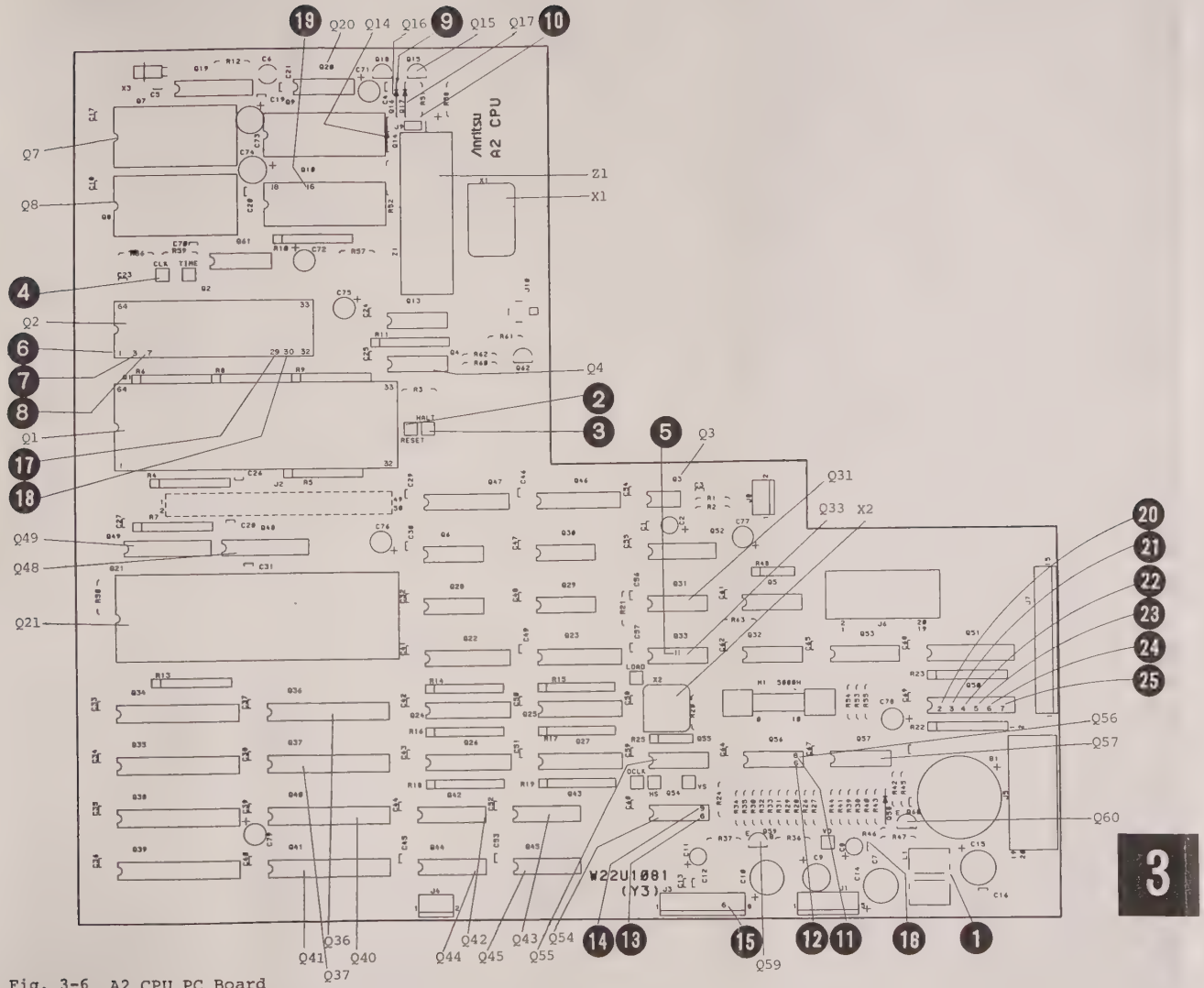
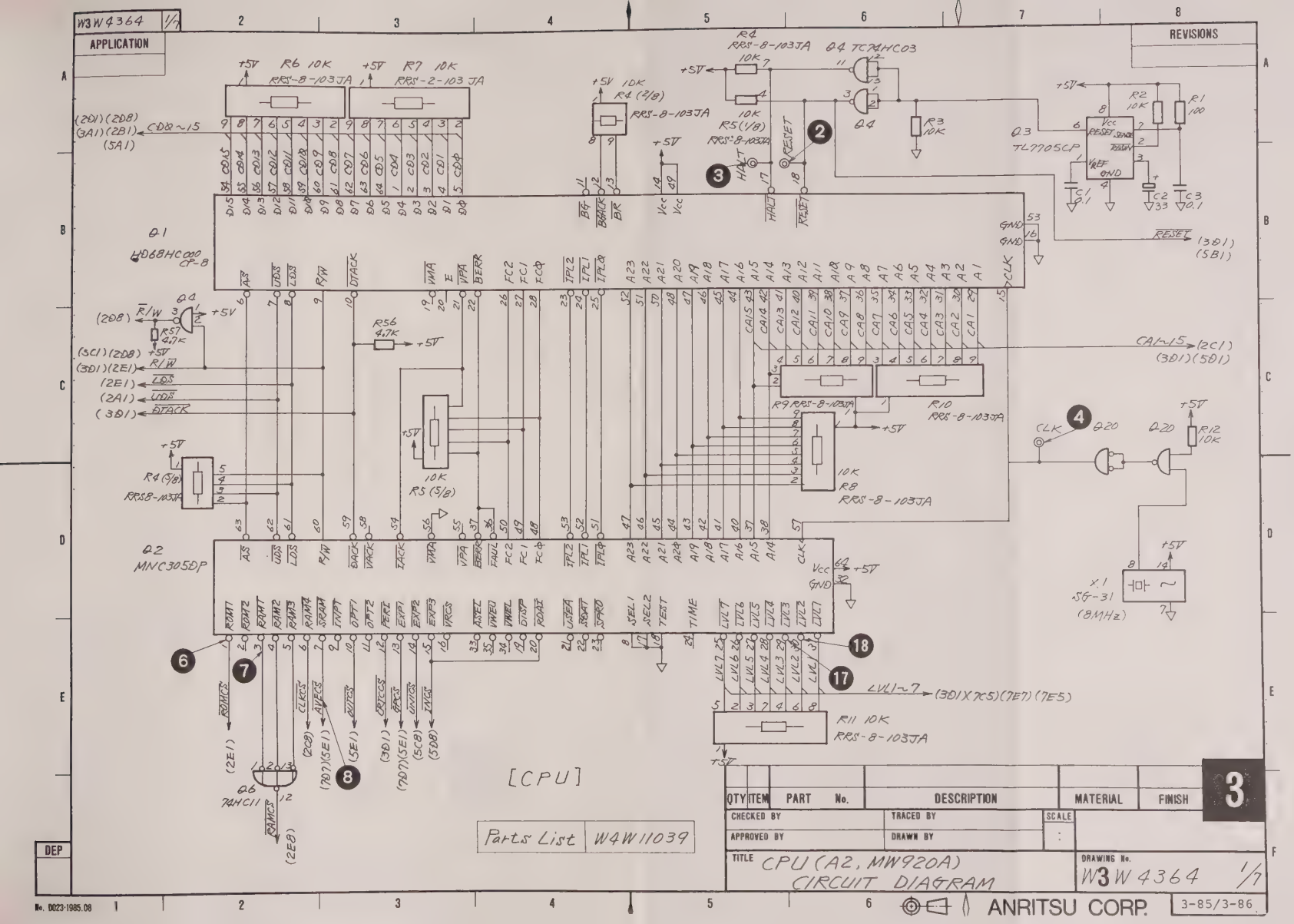
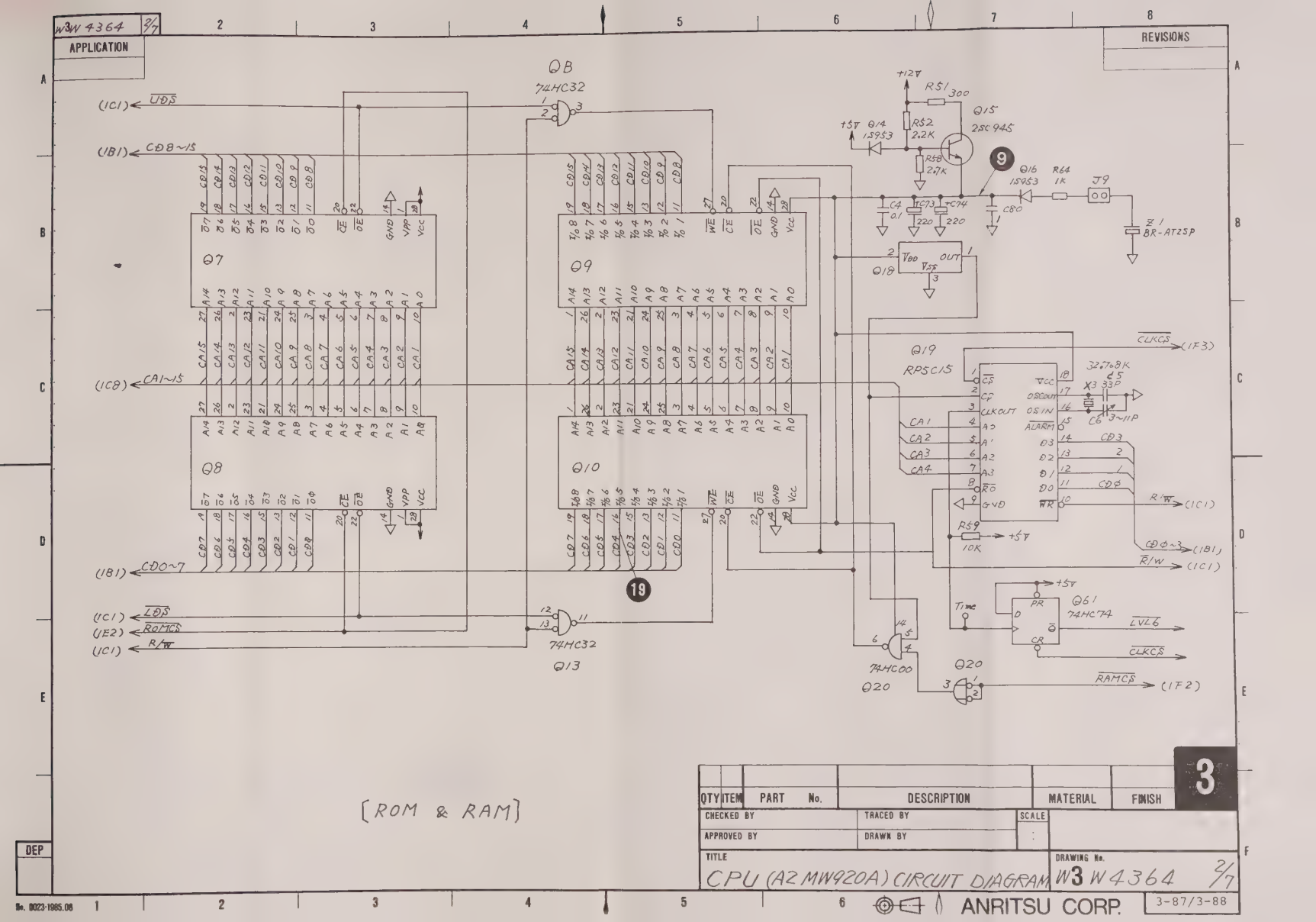
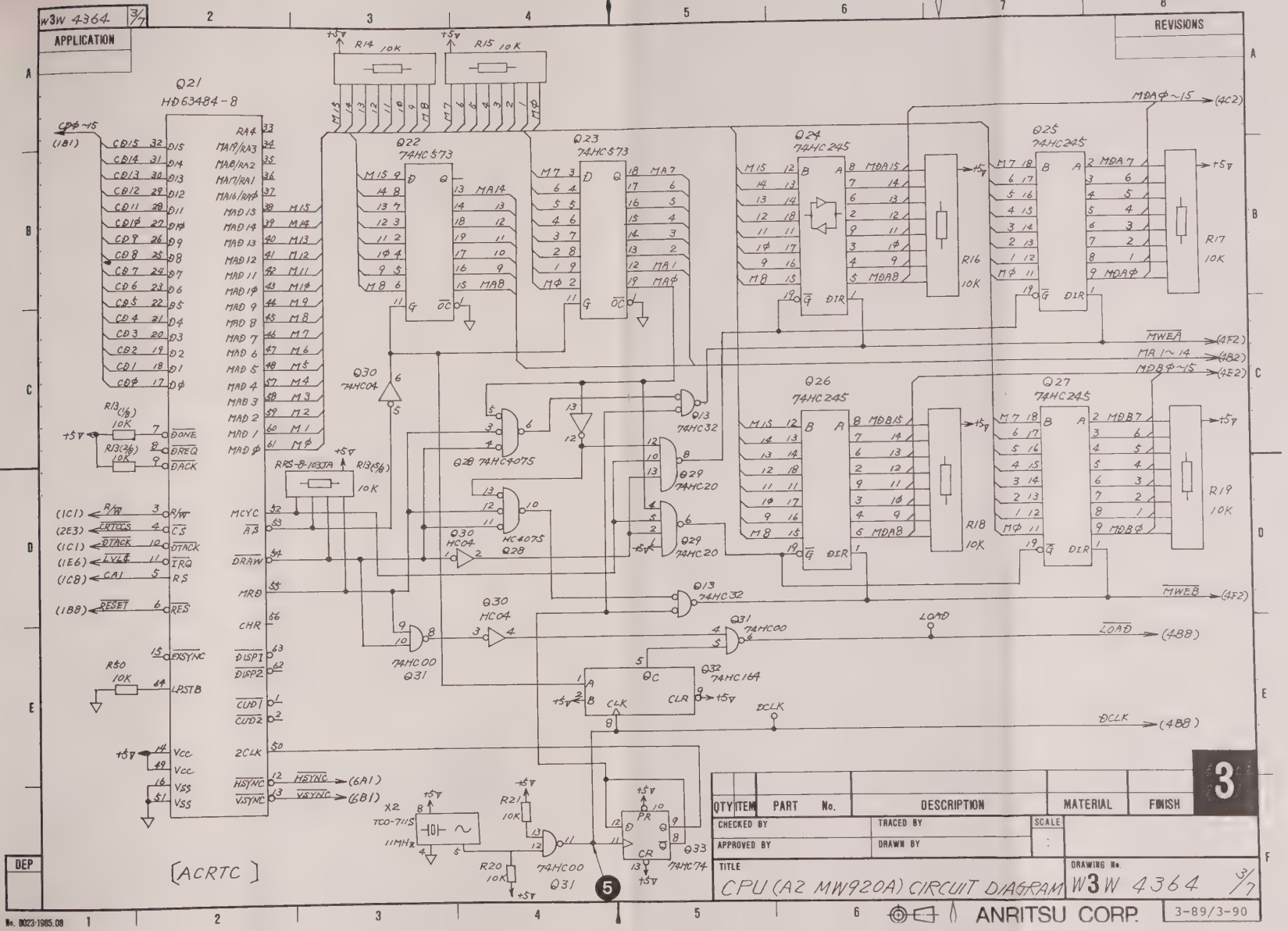
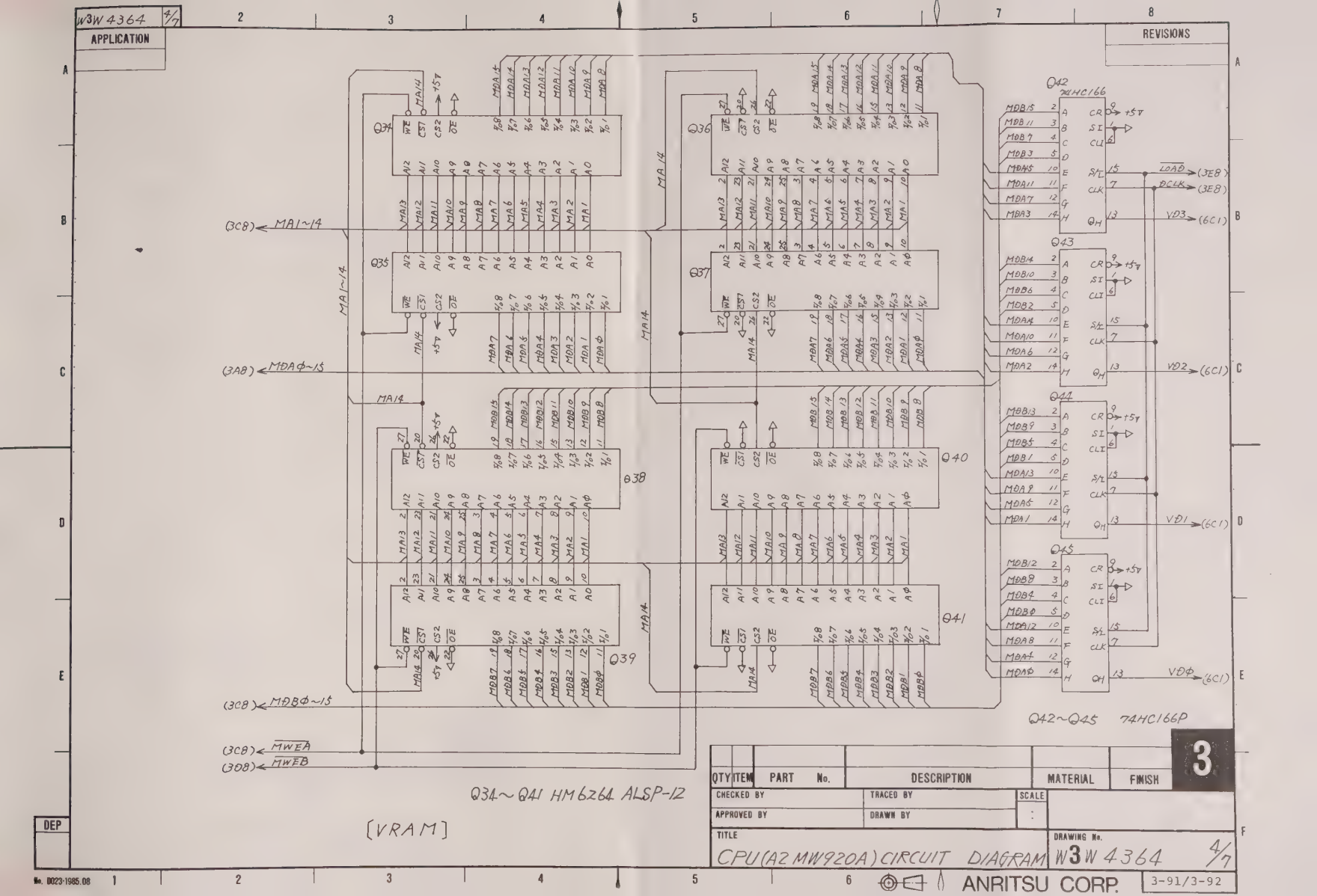


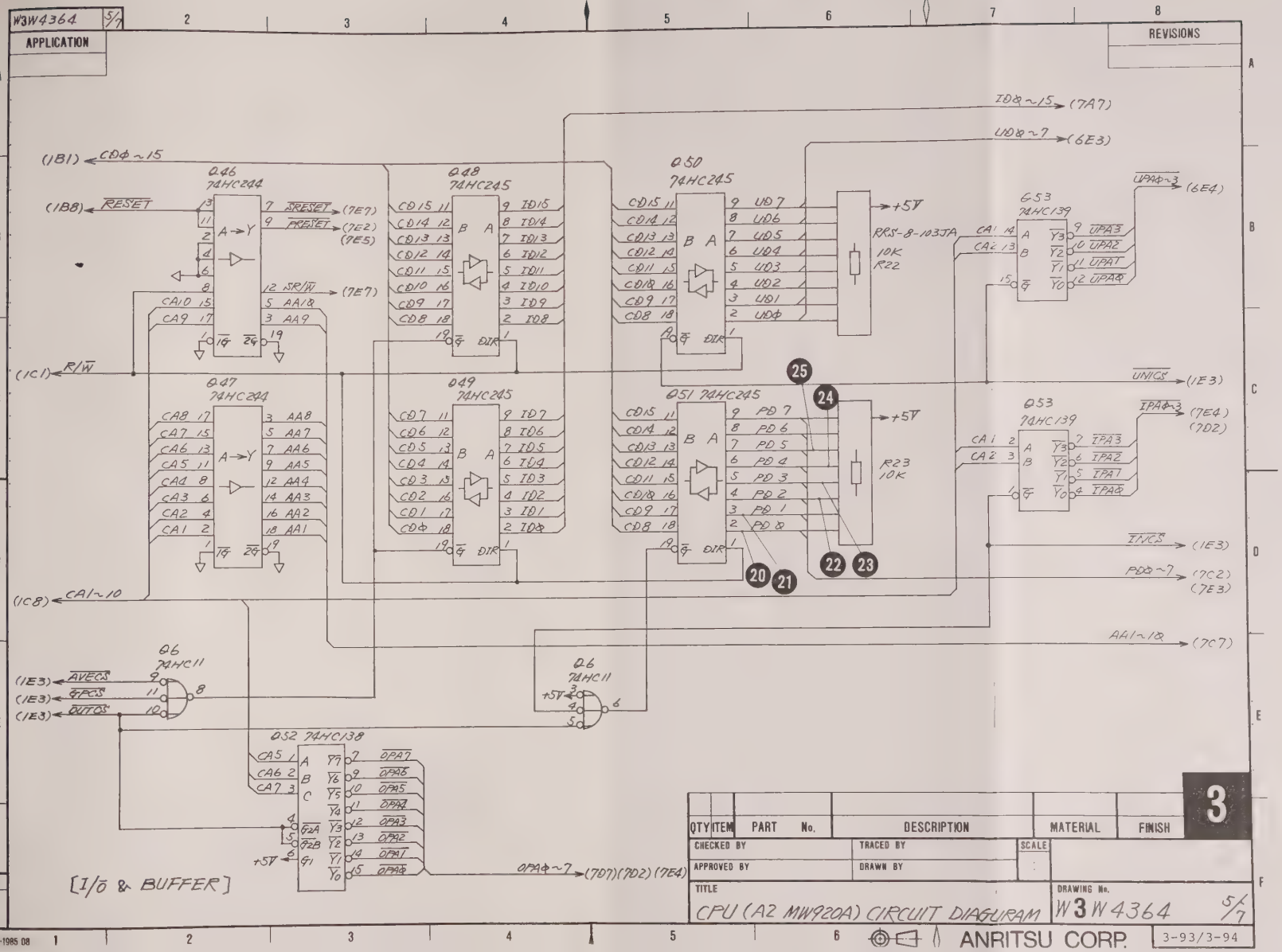
Fig. 3-6 A2 CPU PC Board Parts Layout

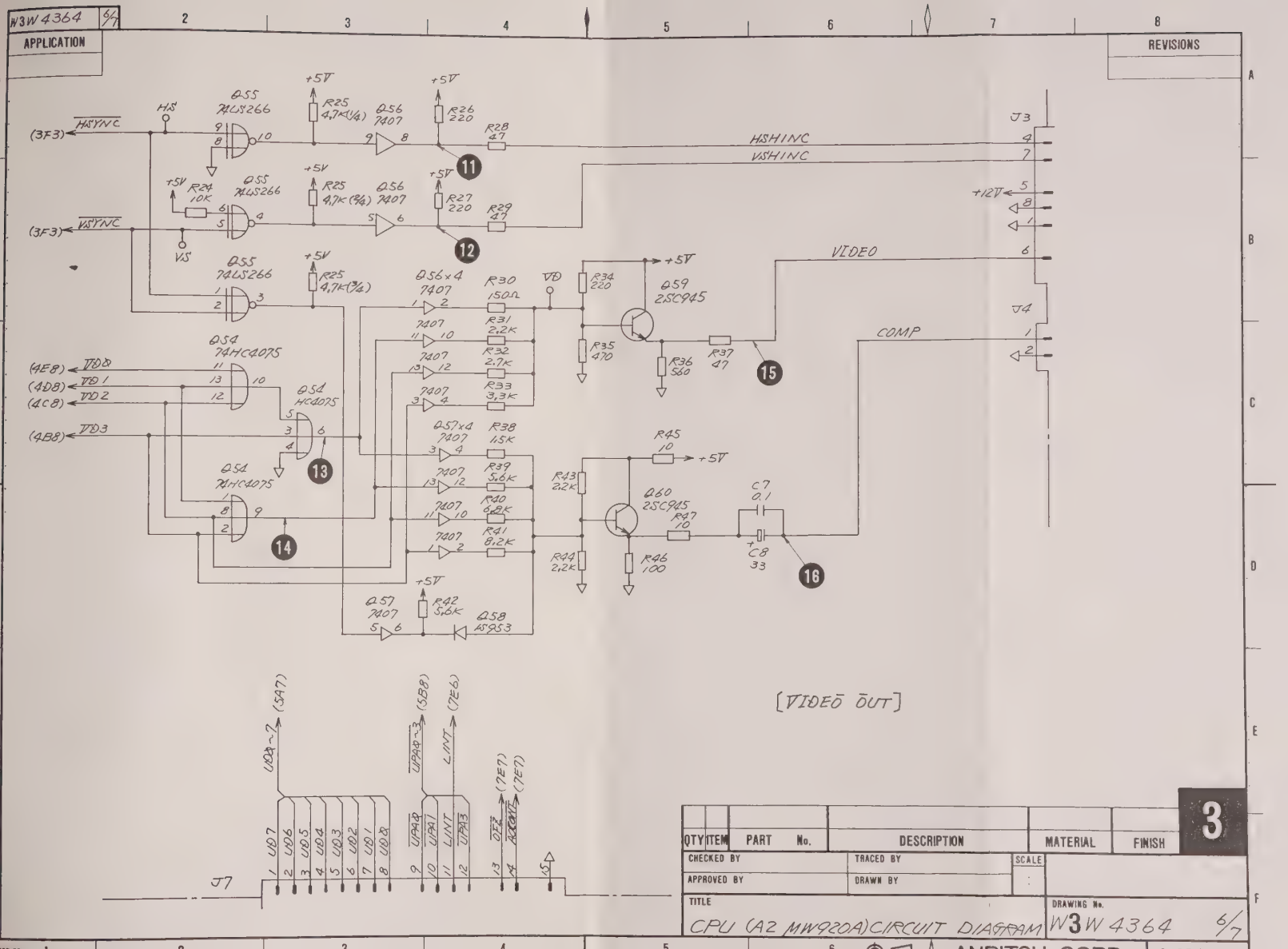

W3W4364 1/7
APPLICATION
REVISIONS
[CPU]
Parts List W4W11039
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE
TITLE CPU (A2, MW920A) CIRCUIT DIAGRAM
DRAWING No. W3W4364 1/7
ANRITSU CORP.
3-85/3-86
DEP
No. 0023-1985.08

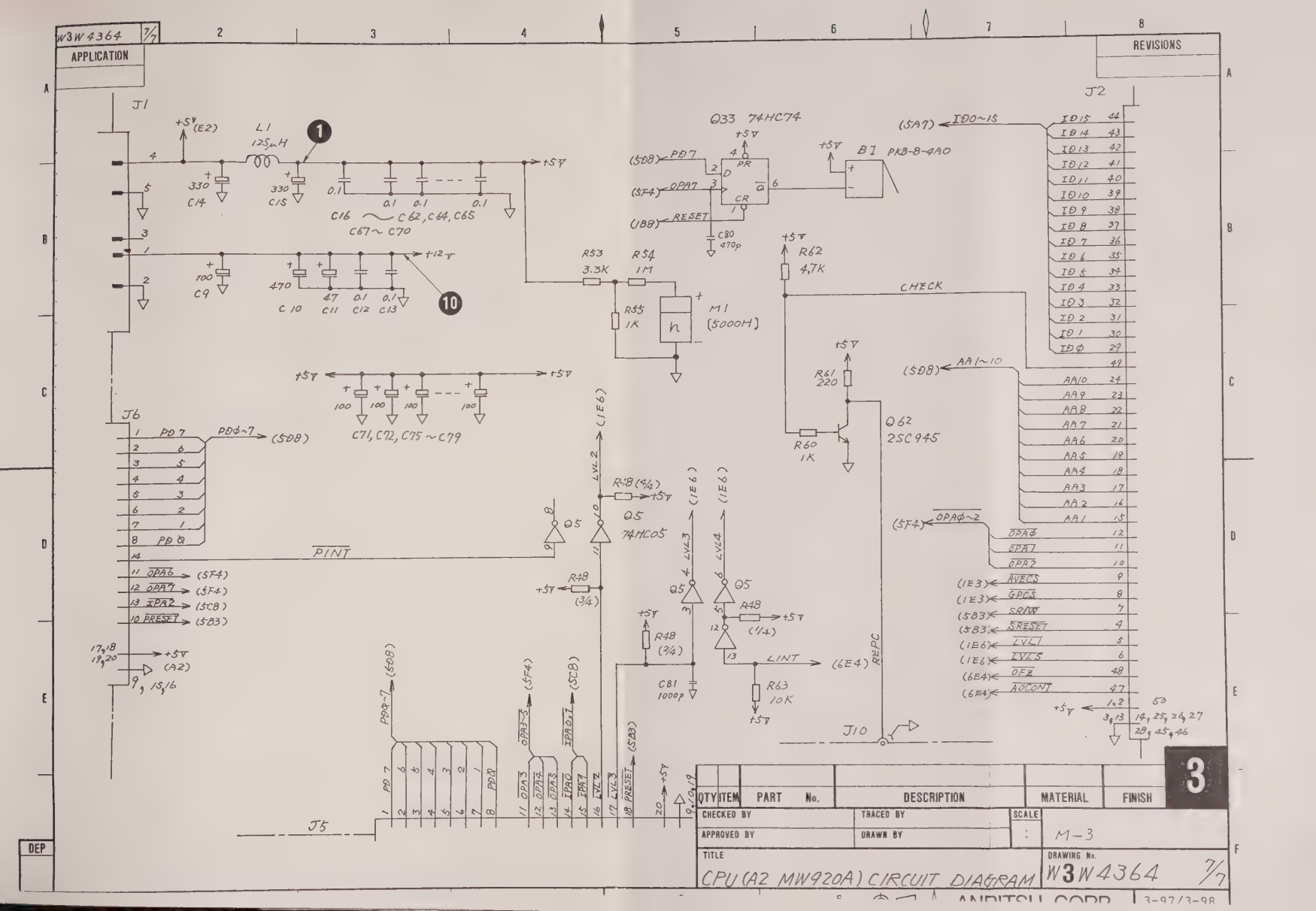

W3W4364 2/7
APPLICATION
REVISIONS
Q8
74HC32
Q7
Q9
Q10
Q13
Q18
Q19
RPSC15
Q61
74HC74
Q20
74HC00
R51 300
R52 2.2K
R58 2.7K
Q15 2SC945
Q14 1S953
Q16 1S953
R64 1K
J9
Z1 BR-AT25P
C4 0.1
C73 220
C74 220
C80 1
32.768K
X3 33P
C5 3~11P
R59 10K
+12V
+5V
UDS
CD8~15
CA1~15
CD0~7
LDS
ROMCS
R/W
CLKCS
RAMCS
LVL6
Time
(IC1)
(IB1)
(IC8)
(IB1)
(IC1)
(JE2)
(IC1)
(IF3)
(IB1)
(IC1)
(IC1)
(IF2)
9
19
[ROM & RAM]
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE
TITLE
CPU (A2MW920A) CIRCUIT DIAGRAM
DRAWING No. W3W4364 2/7
DEP
3
ANRITSU CORP.
3-87/3-88
No. 0023-1985.08


W3W 4364 3/7
APPLICATION
REVISIONS
Q21
HD63484-8
R14 10K
R15 10K
Q22
74HC573
Q23
74HC573
Q24
74HC245
Q25
74HC245
Q26
74HC245
Q27
74HC245
R16 10K
R17 10K
R18 10K
R19 10K
Q30
74HC04
Q28 74HC4075
Q13
74HC32
Q29
74HC20
Q31
74HC00
Q32
74HC164
Q33
74HC74
R50 10K
R21 10K
R20 10K
X2
TCO-7115
11MHz
MDAØ~15 (4C2)
MWEA (4F2)
MA1~14 (4B2)
MDBØ~15 (4E2)
MWEB (4F2)
LOAD
LOAD (4B8)
DCLK
DCLK (4B8)
HSYNC (6A1)
VSYNC (6B1)
RESET (1B8)
[ACRTC]
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
TRACED BY
SCALE
APPROVED BY
DRAWN BY
TITLE
CPU (A2 MW920A) CIRCUIT DIAGRAM
DRAWING No.
W3W 4364 3/7
ANRITSU CORP.
3-89/3-90
DEP
No. 0023-1985.08


W3W4364 4/7
APPLICATION
REVISIONS
Q37
Q36
Q35
Q38
Q39
Q34
Q40
Q41
Q42
Q43
Q44
Q45
74HC166
(3C8) MA1~14
(3AB) MDAØ~15
(3C8) MDBØ~15
(3C8) MWEA
(3D8) MWEB
MA14
LOAD (3E8)
DCLK (3E8)
VD3 (6C1)
VD2 (6C1)
VD1 (6C1)
VDØ (6C1)
Q42~Q45 74HC166P
Q34~Q41 HM6264 ALSP-12
[VRAM]
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
TRACED BY
SCALE
APPROVED BY
DRAWN BY
TITLE
CPU(A2MW920A)CIRCUIT DIAGRAM
DRAWING No. W3W4364 4/7
DEP
No. 0023-1985.08
ANRITSU CORP.
3-91/3-92


W3W4364 5/7
APPLICATION
REVISIONS
Q46 74HC244
Q47 74HC244
Q48 74HC245
Q49 74HC245
Q50 74HC245
Q51 74HC245
Q53 74HC139
Q6 74HC11
Q52 74HC138
RRS-8-103JA
10K R22
R23 10K
(1B1) CD0~15
(1B8) RESET
(1C1) R/W
(1C8) CA1~10
(7A7) ID0~15
(6E3) UD0~7
(6E4) UPA0~3
(7E7) SRESET
(7E2) (7E5) PRESET
(7E7) SR/W
(1E3) UNICS
(7E4) (7D2) IPA0~3
(1E3) INICS
(7C2) (7E3) PD0~7
(7C7) AA1~18
(1E3) AVECS
(1E3) OPICS
(1E3) OUTCS
OPA0~7 (7D7)(7D2)(7E4)
[I/O & BUFFER]
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE
TITLE
CPU (A2 MW920A) CIRCUIT DIAGRAM
DRAWING No. W3W4364 5/7
ANRITSU CORP.
3-93/3-94


W3W4364 6/7
APPLICATION
REVISIONS
HSYNC
VSYNC
HS
VS
(3F3)
Q55 74LS266
R25 4.7K(1/4)
Q56 7407
R26 220
R28 47
R27 220
R29 47
+5V
+12V
HSHINC
VSHINC
VIDEO
COMP
J3
J4
R24 1.0K
Q56×4 7407
R30 150Ω
R31 2.2K
R32 2.7K
R33 3.3K
VD
R34 220
Q59 2SC945
R35 470
R36 560
R37 47
Q54 74HC4075
(4E8) VD0
(4D8) VD1
(4C8) VD2
(4B8) VD3
Q54 HC4075
Q57×4 7407
R38 1.5K
R39 5.6K
R40 6.8K
R41 8.2K
R45 10
R43 2.2K
Q60 2SC945
R47 10
R44 2.2K
R46 100
C7 0.1
C8 33
Q57 7407
R42 5.6K
Q58 1S953
13
14
15
16
[VIDEO OUT]
UDA~7 (5A7)
UPA0~3 (5B8)
LINT (7E6)
(7E7)
(7E7)
J7
UD7
UD6
UD5
UD4
UD3
UD2
UD1
UD0
UPA0
UPA1
LINT
UPA3
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
3
CHECKED BY
TRACED BY
SCALE
APPROVED BY
DRAWN BY
TITLE
CPU (A2 MW920A) CIRCUIT DIAGRAM
DRAWING No.
W3W4364 6/7
ANRITSU CORP.
3-95/3-96
No. 0023-1985 08


W3W4364 7/7
APPLICATION
REVISIONS
J1
J2
J5
J6
J10
+5V (E2)
L1 125μH
C14 330
C15 330
C16 ~ C62, C64, C65
C67 ~ C70 0.1
C9 100
C10 470
C11 47
C12 0.1
C13 0.1
+12V
C71, C72, C75 ~ C79 100
Q33 74HC74
PR
D
CR
C80 470p
RESET
PD7
OPA7
B1 PKB-8-4A0
R53 3.3K
R54 1M
R55 1K
M1 (5000H)
R62 4.7K
CHECK
R61 220
R60 1K
Q62 2SC945
IDO~15
ID15 44
ID14 43
ID13 42
ID12 41
ID11 40
ID10 39
ID9 38
ID8 37
ID7 36
ID6 35
ID5 34
ID4 33
ID3 32
ID2 31
ID1 30
IDO 29
AA1~10
AA10 24
AA9 23
AA8 22
AA7 21
AA6 20
AA5 19
AA4 18
AA3 17
AA2 16
AA1 15
OPAO~2
OPA6 12
OPA7 11
OPA2 10
AVECS 9
GPCS 8
SRW 7
SRESET 4
LVL1 5
LVL5 6
OE 48
AOCONT 47
PD7 PDO~7 (5D8)
PDO
PINT
OPA6 (5F4)
OPA7 (5F4)
IPA2 (5C8)
PRESET (5B3)
R48 (3/4)
R48 (1/4)
Q5 74HC05
LVL2 (1E6)
LVL3 (1E6)
LVL4 (1E6)
LINT (6E4)
REPC
C81 1000p
R63 10K
OPA3~5
IPAO~1
LVL2
LVL3
PRESET (5B3)
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE : M-3
TITLE
CPU (A2 MW920A) CIRCUIT DIAGRAM
DRAWING No. W3W4364 7/7
ANRITSU CORP
3-97/3-98

3.6.4 A3 ADD 4

(1) Circuit description

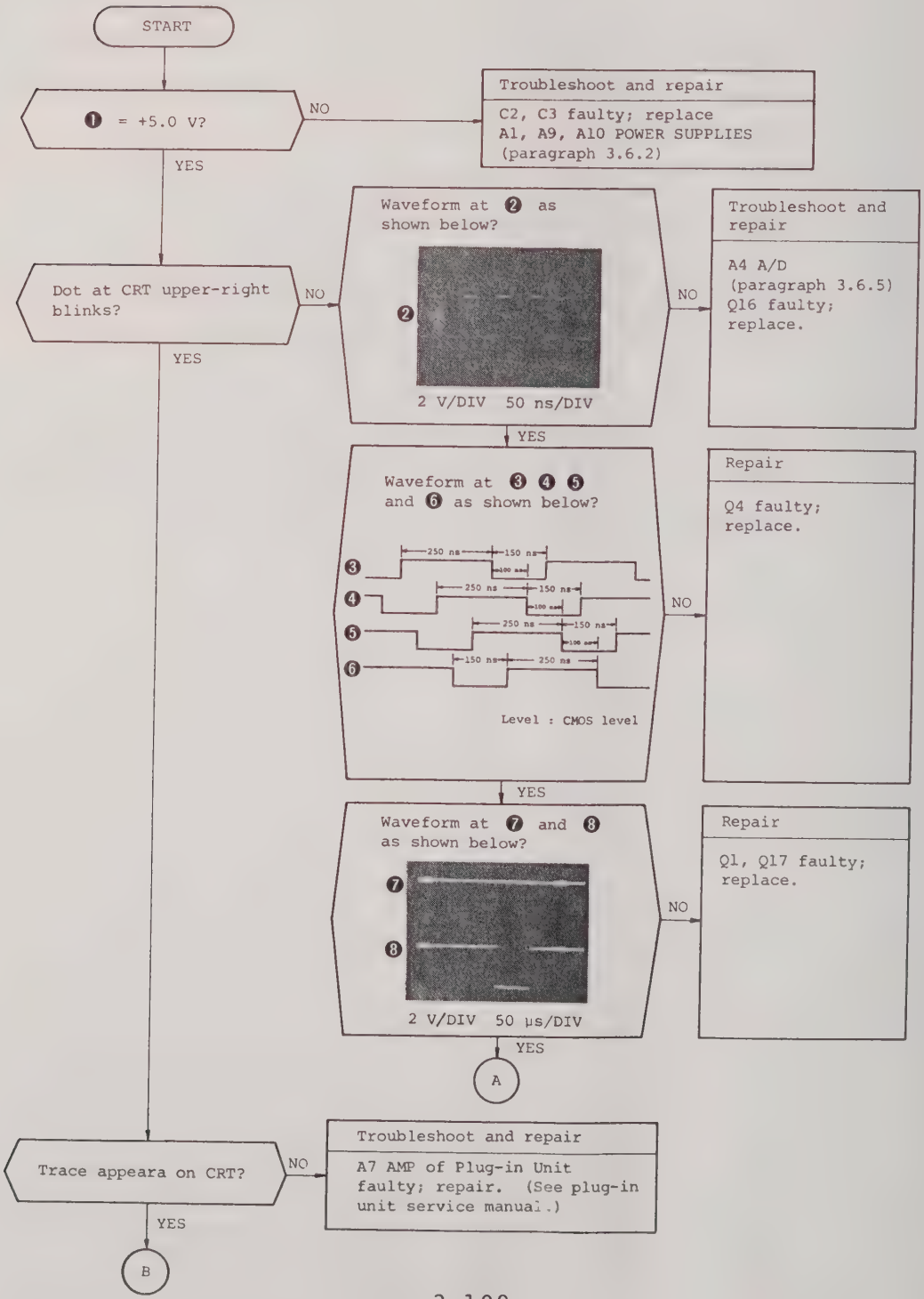
The A3 ADD PC board adds the 6-bit digital signal from the A4 A/D PC board to convert it to 16-bit data. This PC board also generates the laser diode (LD) drive trigger signal etc. and it also includes the control section for GP-IB.

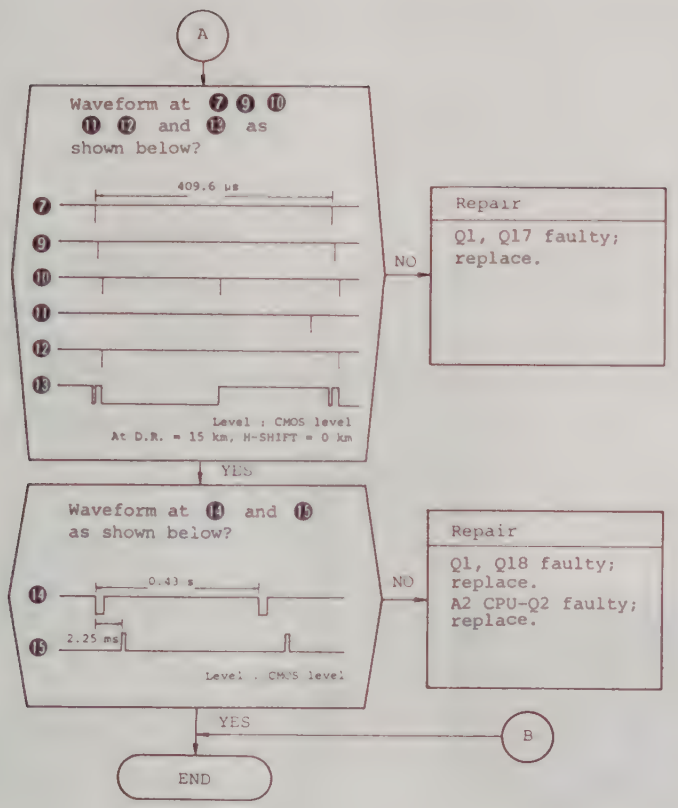
The 6-bit digital signal received from the A4 A/D PC board is stored once in the RAM (Q5 to Q12). At the next period, new data is added to old data in the RAM and restored. Eight RAM addresses are created in Q4. Addition is performed in Q2 and Q3.

Q1 receives the clock signal from the A4 A/D PC board, and generates the laser diode drive trigger, the A/O switch ON/OFF trigger, and the A/D converter sampling start/stop/mask triggers.

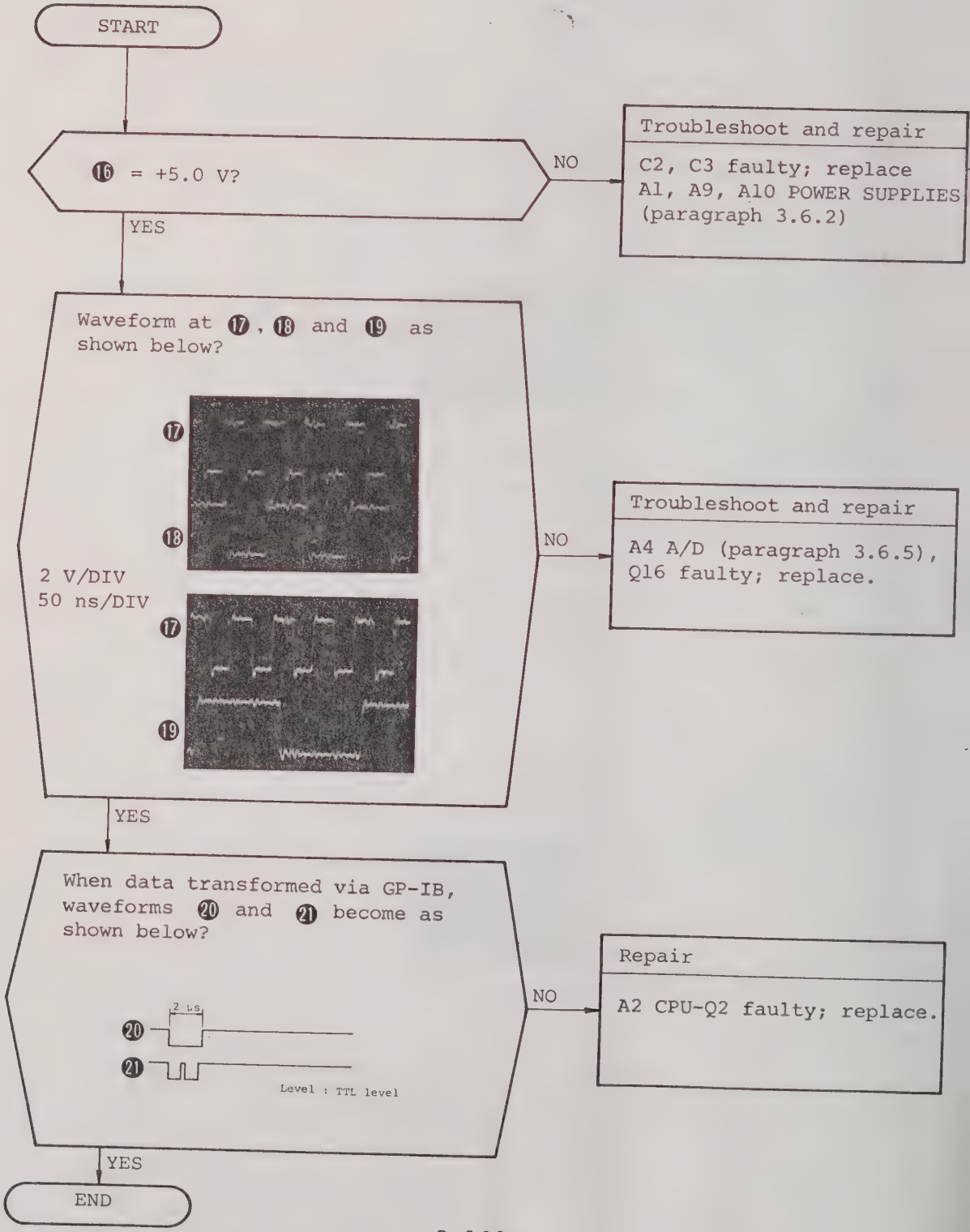
(2) Troubleshooting and repair

(a) ADD troubleshooting and repair




A
Waveform at ❼ ❾ ❿ ⓫ ⓬ and ⓭ as shown below?
409.6 µs
❼
❾
❿
⓫
⓬
⓭
Level : CMOS level
At D.R. = 15 km, H-SHIFT = 0 km
NO
Repair
Q1, Q17 faulty; replace.
YES
Waveform at ⓮ and ⓯ as shown below?
0.43 s
⓮
2.25 ms
⓯
Level : CMOS level
NO
Repair
Q1, Q18 faulty; replace.
A2 CPU-Q2 faulty; replace.
YES
B
END

(b) GP-IB troubleshooting and repair



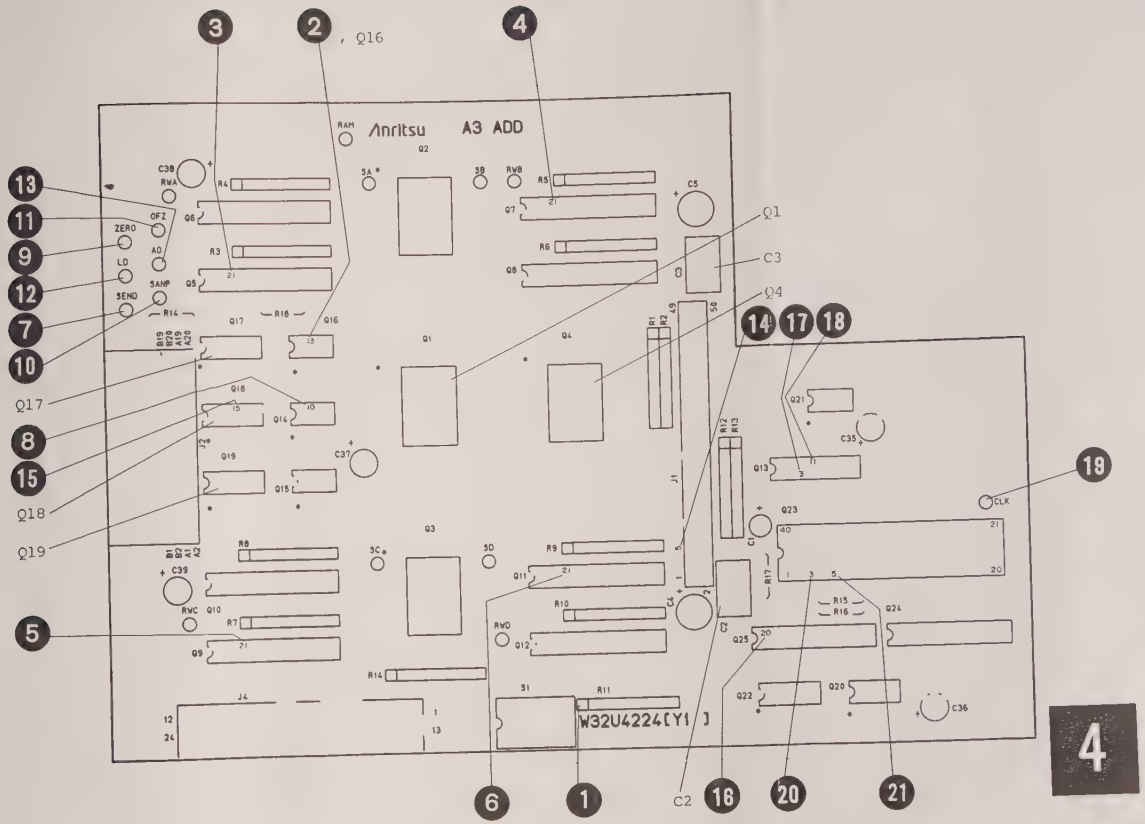
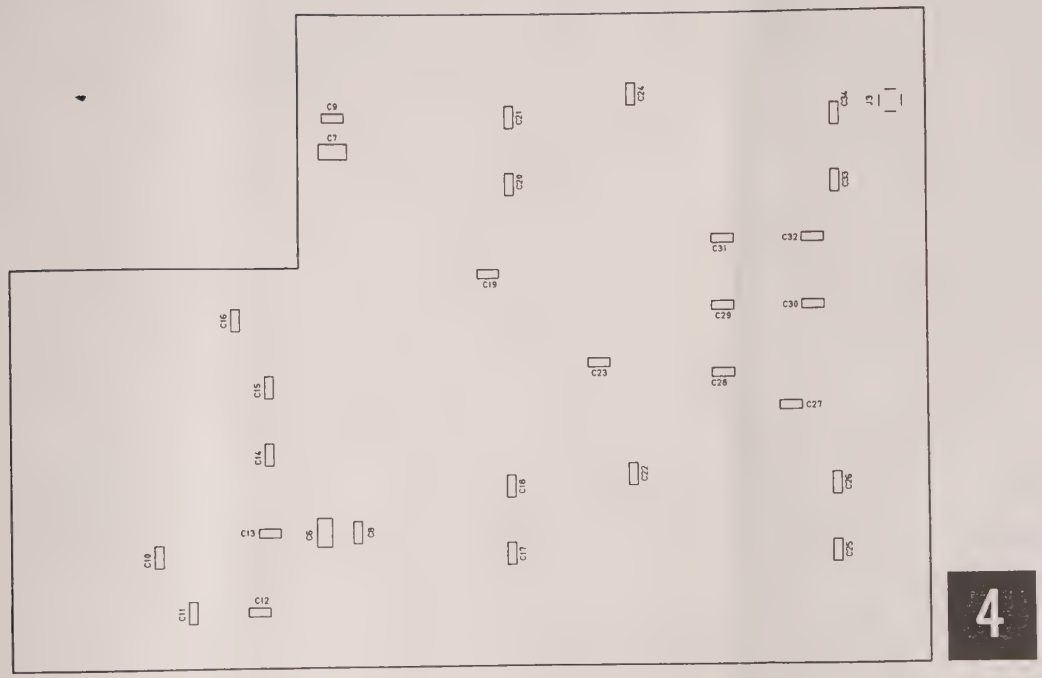
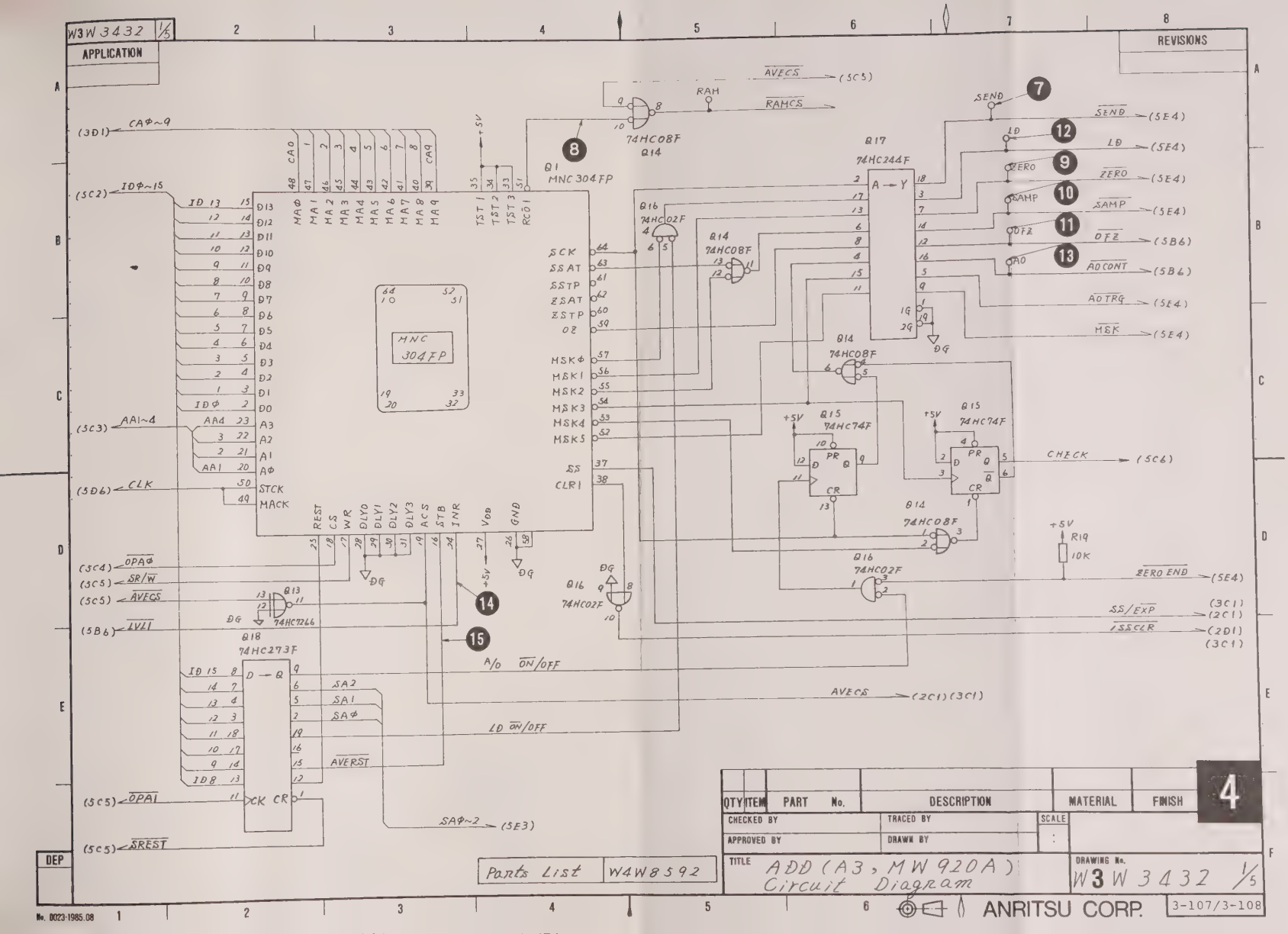


Fig. 3-7 A3 ADD PC Board
Parts Layout-Front Side



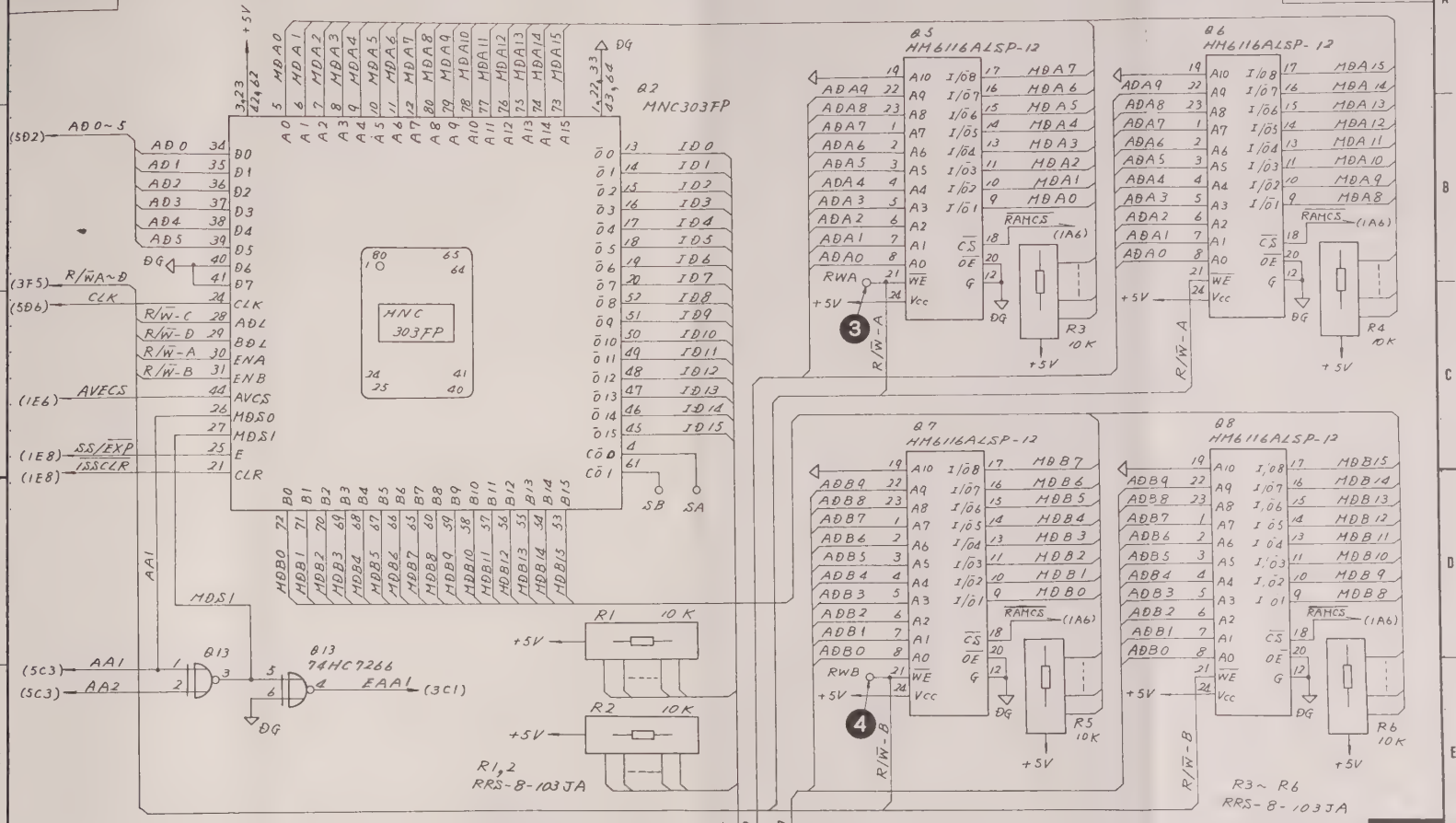
(This side has no check point.)

Fig. 3-8 A3 ADD PC Board
Parts Layout-Rear Side


W3W3432 1/5
APPLICATION
REVISIONS
Q1 MNC304FP
MNC 304FP
74HC08F Q14
74HC02F Q16
74HC244F Q17
74HC74F Q15
74HC273F Q18
74HC74G Q13
AVECS (5C5)
RAM
RAMCS
SEND (5E4)
LD (5E4)
ZERO (5E4)
SAMP (5E4)
DFZ (5B6)
ADCONT (5B6)
ADTRG (5E4)
MSK (5E4)
CHECK (5C6)
ZERO END (5E4)
SS/EXP (3C1) (2C1)
ISSCLR (2D1) (3C1)
AVECS (2C1)(3C1)
LD ON/OFF
A/D ON/OFF
AVERST
SA0~2 (5E3)
(3D1) CA0~9
(5C2) ID0~15
(5C3) AA1~4
(5D6) CLK
(5C4) OPA0
(5C5) SR/W
(5C5) AVECS
(5B6) LVL1
(5C5) OPA1
(5C5) SREST
R19 10K
Parts List W4W8592
DRAWING No. W3W3432 1/5
TITLE ADD (A3, MW920A) Circuit Diagram
ANRITSU CORP.
3-107/3-108
No. 0023-1985.08
DEP

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY | TRACED BY | SCALE

APPROVED BY | DRAWN BY

TITLE ADD (A3, MW920A) Circuit Diagram

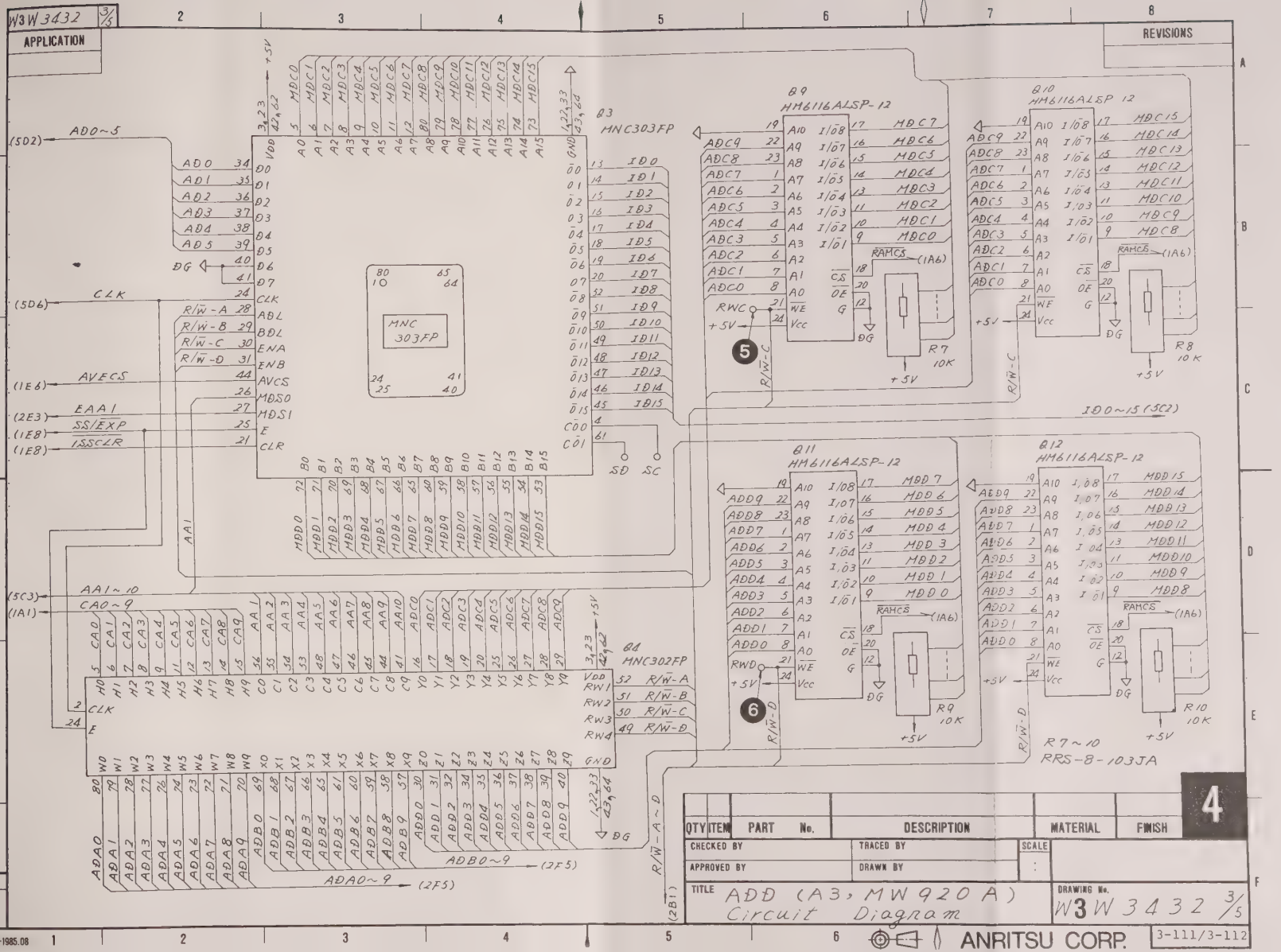
DRAWING No. W3W3432 2/5

DEP

ANRITSU CORP.

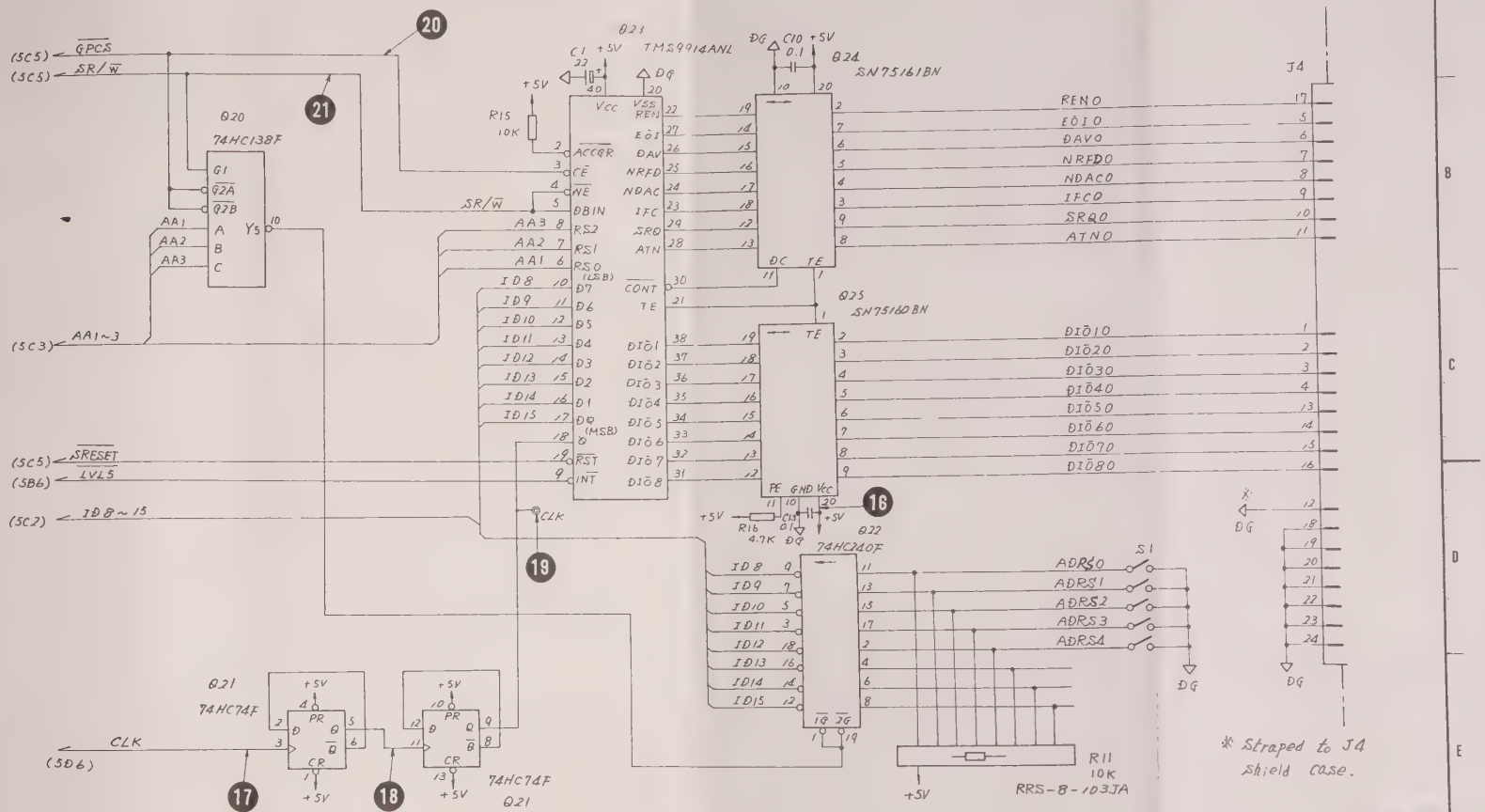
3-109/3-110

No. 0023-1985.08


W3W3432 3/5
APPLICATION
REVISIONS
Q3 MNC303FP
Q4 MNC302FP
Q9 HM6116ALSP-12
Q10 HM6116ALSP-12
Q11 HM6116ALSP-12
Q12 HM6116ALSP-12
MNC 303FP
RAMCS (1A6)
R7 10K
R8 10K
R9 10K
R10 10K
R7~10 RRS-8-103JA
ADO~5 (5D2)
CLK (5D6)
AVECS (1E6)
EAAI (2E3)
SS/EXP (1E8)
ISSCLR (1E8)
AAI~10 (5C3)
CA0~9 (1A1)
IDO~15 (3C2)
ADAO~9 (2F5)
ADBO~9 (2F5)
R/W-A~D (2B1)
SD
SC
DG
+5V
RWC
RWD
QTY
ITEM
PART No.
DESCRIPTION
MATERIAL
FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE
TITLE ADD (A3, MW920A) Circuit Diagram
DRAWING No. W3W3432 3/5
DEP
ANRITSU CORP.
3-111/3-112
No. 0023-1985.08

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

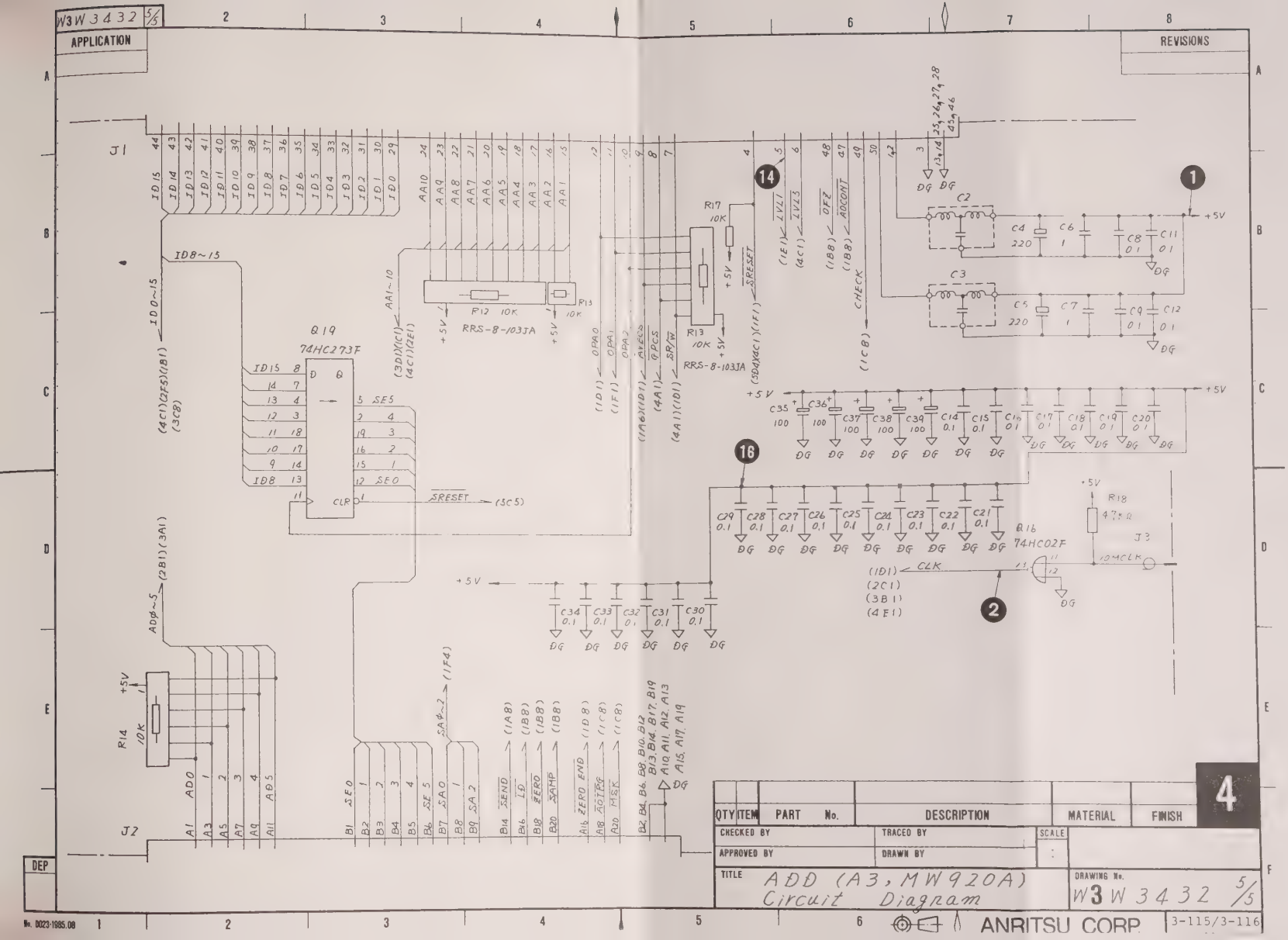
CHECKED BY | TRACED BY | SCALE M-1

APPROVED BY | DRAWN BY

TITLE ADD (A3, MW920A) Circuit Diagram

DRAWING No. W3W3432 4/5

DEP


W3W3432 5/5
APPLICATION
REVISIONS
J1
ID15 ID14 ID13 ID12 ID11 ID10 ID9 ID8 ID7 ID6 ID5 ID4 ID3 ID2 ID1 ID0
AA10 AA9 AA8 AA7 AA6 AA5 AA4 AA3 AA2 AA1
ID8~15
ID0~15
AA1~10
(4C1)(2F5)(1B1)(3C8)
(3D)(1C1)(4C1)(2E1)
Q19
74HC273F
ID15 ID14 ID13 ID12 ID11 ID10 ID9 ID8
SE5 SE0
CLR
SRESET (3C5)
P12 10K
P13 10K
RRS-8-103JA
R17 10K
R13 10K
RRS-8-103JA
+5V
OPA0 OPA1 OPA2 AVERS TPCS SR/HT
(1D1) (1F1) (1A6)(1D1) (4A1) (4A1)(1D1)
(3D4)(4C1)(1F1) SRESET
(1E1) LVL1 (4C1) LVL2
(1B8) OFST
(1B8) AOCONT
(1B8) CHECK
(1C8)
14 16 1 2
C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28 C29 C30 C31 C32 C33 C34 C35 C36 C37 C38 C39
220 1 0.1 100
DG
Q16
74HC02F
R18 47kΩ
J3
10MCLK
(1D1) CLK
(2C1)
(3B1)
(4E1)
(2B1)(3A1)
AD0~5
R14 10K
J2
A1 A3 A5 A7 A9 A11 AD0 AD5
B1 B2 B3 B4 B5 B6 B7 B8 B9 B14 B16 B18 B20 A16 A18 A20
SE0 SE5 SA0 SA2 SA0~2 (1F4)
SEND LD ZERO ZAMP ZERO END ZOTPR MSK
(1A8) (1B8) (1B8) (1B8) (1D8) (1C8) (1C8)
B2, B4, B6, B8, B10, B12 B13, B14, B17, B19 A10, A11, A12, A13 A15, A17, A19
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY TRACED BY SCALE
APPROVED BY DRAWN BY
TITLE ADD (A3, MW920A) Circuit Diagram
DRAWING No. W3W3432 5/5
ANRITSU CORP
3-115/3-116
No. 0023-1985.08

3.6.5 A4 A/D 5

(1) Circuit description

The A4 A/D PC board consists of four circuits: a circuit that generates the sampling clock signal for distance accuracy, the A/D converter that converts the OEOUT signal (analog signal) to a digital signal, a circuit that stores the converted digital OEOUT signal in the memory once, and a circuit that moves the mask trigger signal in 2 m steps.

The sampling clock is generated by dividing the 99.93082 MHz output of the crystal oscillator X1.

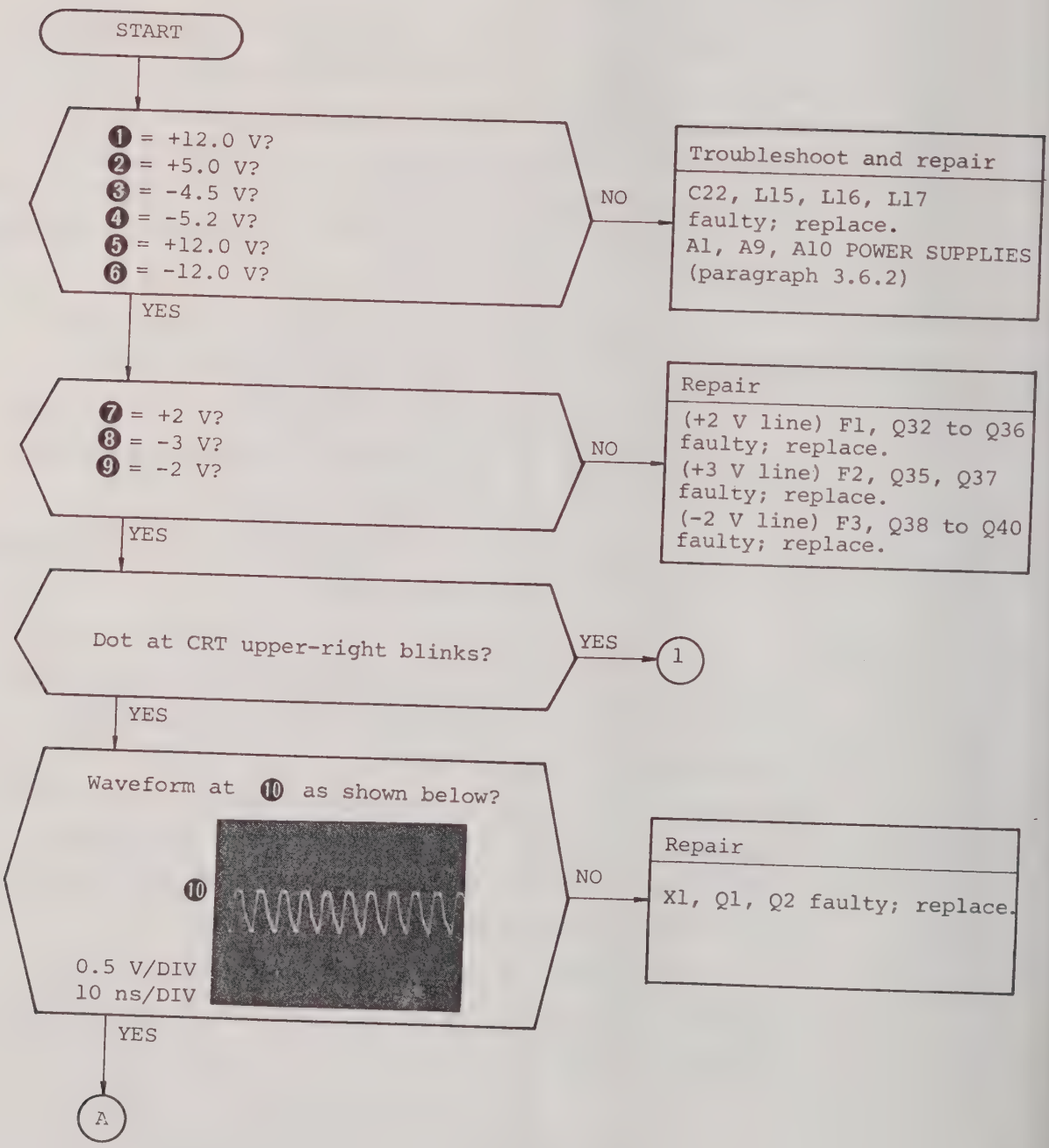
To achieve a readout resolution of 10 cm, 1 ns (10 cm) sampling is performed by moving the 20 ns divided output in 1 ns steps.

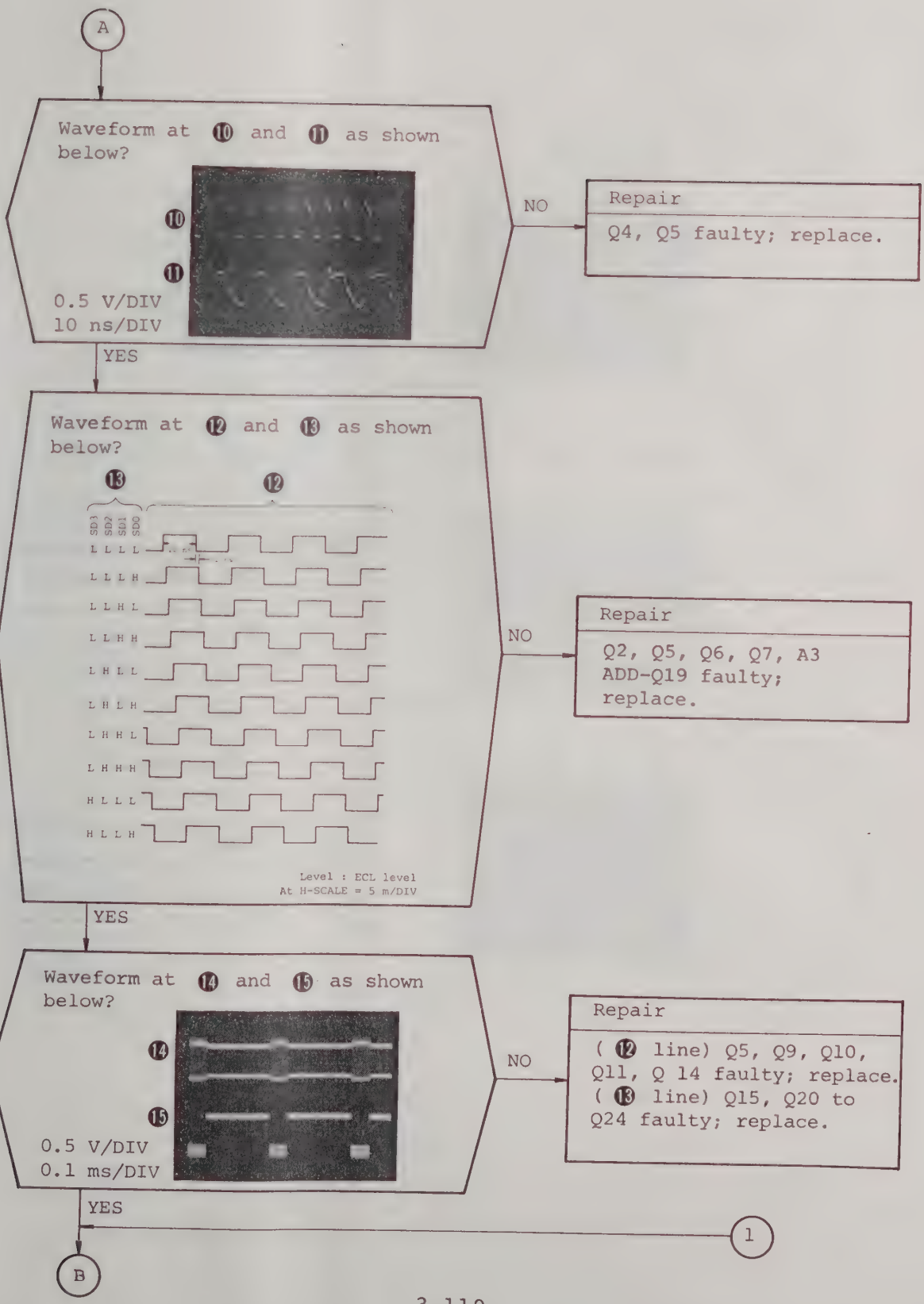
A/D conversion of the OEOUT signal is performed by the Q16 6-bit A/D converter.

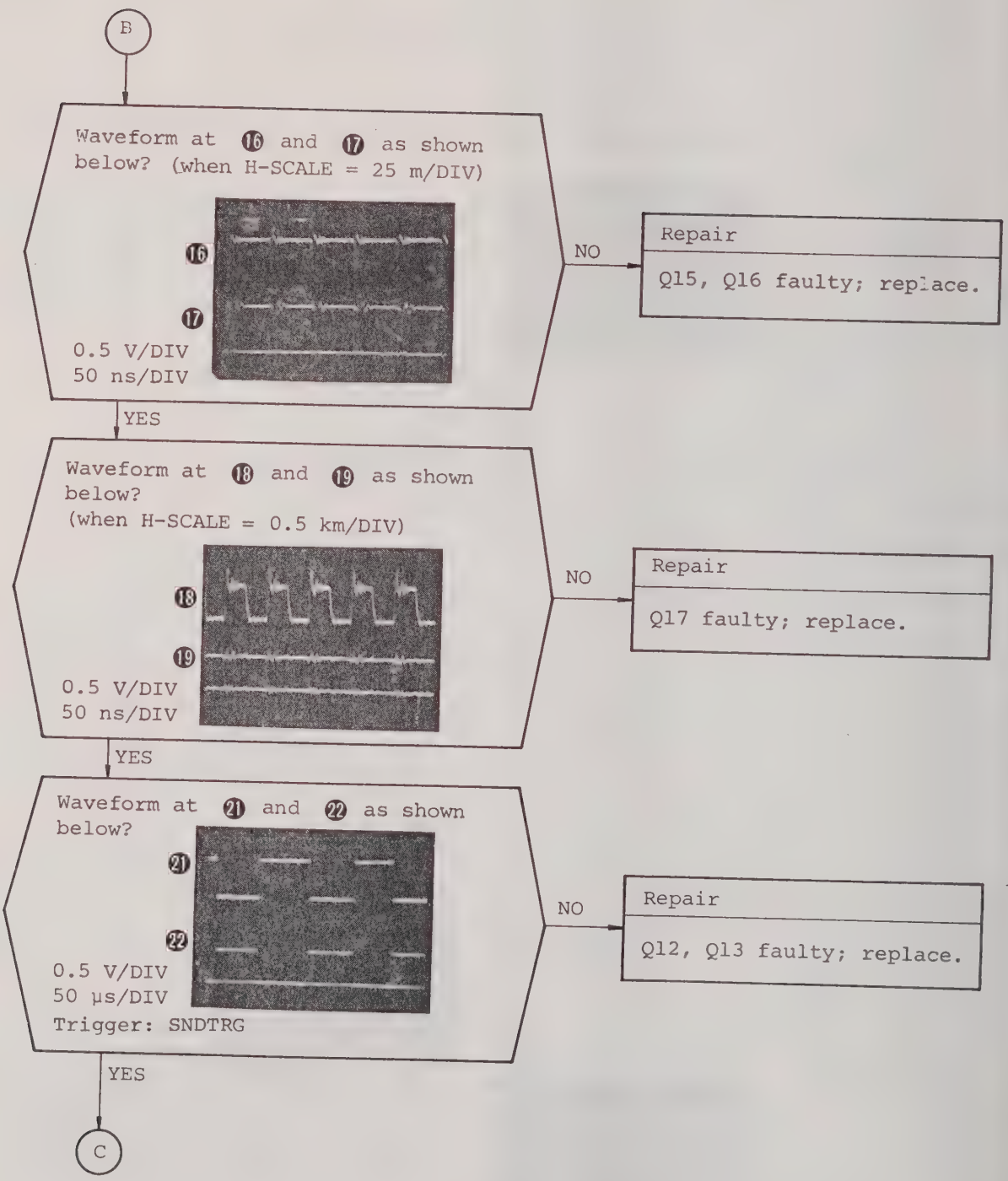
Data for one period, which is converted to a digital signal by the A/D converter, is stored once inthe Q18 and Q19 high-speed memories, and then transferred to the A3 ADD at a slow period. Q22 to Q24 are counters that generate addresses which are supplied to the high-speed memories. The counter outputs are latched at Q20 and Q21 and then supplied to the high-speed memories.

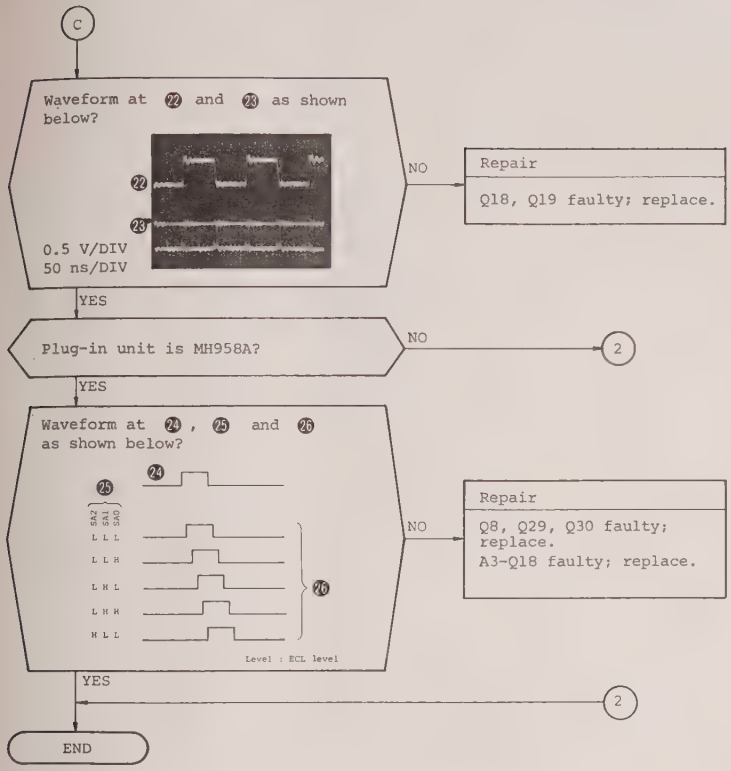
To provide a mask trigger signal with a 2 m distance resolution, a 20 ns time shift is performed at Q29 and Q30.

(2) Troubleshooting and repair




A
Waveform at ⑩ and ⑪ as shown below?
⑩
⑪
0.5 V/DIV
10 ns/DIV
NO
Repair
Q4, Q5 faulty; replace.
YES
Waveform at ⑫ and ⑬ as shown below?
⑬
⑫
SD3 SD2 SD1 SD0
L L L L
L L L H
L L H L
L L H H
L H L L
L H L H
L H H L
L H H H
H L L L
H L L H
Level : ECL level
At H-SCALE = 5 m/DIV
NO
Repair
Q2, Q5, Q6, Q7, A3 ADD-Q19 faulty; replace.
YES
Waveform at ⑭ and ⑮ as shown below?
⑭
⑮
0.5 V/DIV
0.1 ms/DIV
NO
Repair
(⑫ line) Q5, Q9, Q10, Q11, Q 14 faulty; replace.
(⑬ line) Q15, Q20 to Q24 faulty; replace.
YES
1
B


B
Waveform at ⑯ and ⑰ as shown below? (when H-SCALE = 25 m/DIV)
⑯
⑰
0.5 V/DIV
50 ns/DIV
NO
Repair
Q15, Q16 faulty; replace.
YES
Waveform at ⑱ and ⑲ as shown below?
(when H-SCALE = 0.5 km/DIV)
⑱
⑲
0.5 V/DIV
50 ns/DIV
NO
Repair
Q17 faulty; replace.
YES
Waveform at ㉑ and ㉒ as shown below?
㉑
㉒
0.5 V/DIV
50 µs/DIV
Trigger: SNDTRG
NO
Repair
Q12, Q13 faulty; replace.
YES
C


C
Waveform at 22 and 23 as shown below?
22
23
0.5 V/DIV
50 ns/DIV
NO
Repair
Q18, Q19 faulty; replace.
YES
Plug-in unit is MH958A?
NO
2
YES
Waveform at 24, 25 and 26 as shown below?
24
25
SA2 SA1 SA0
L L L
L L H
L H L
L H H
H L L
26
Level : ECL level
NO
Repair
Q8, Q29, Q30 faulty; replace.
A3-Q18 faulty; replace.
YES
2
END

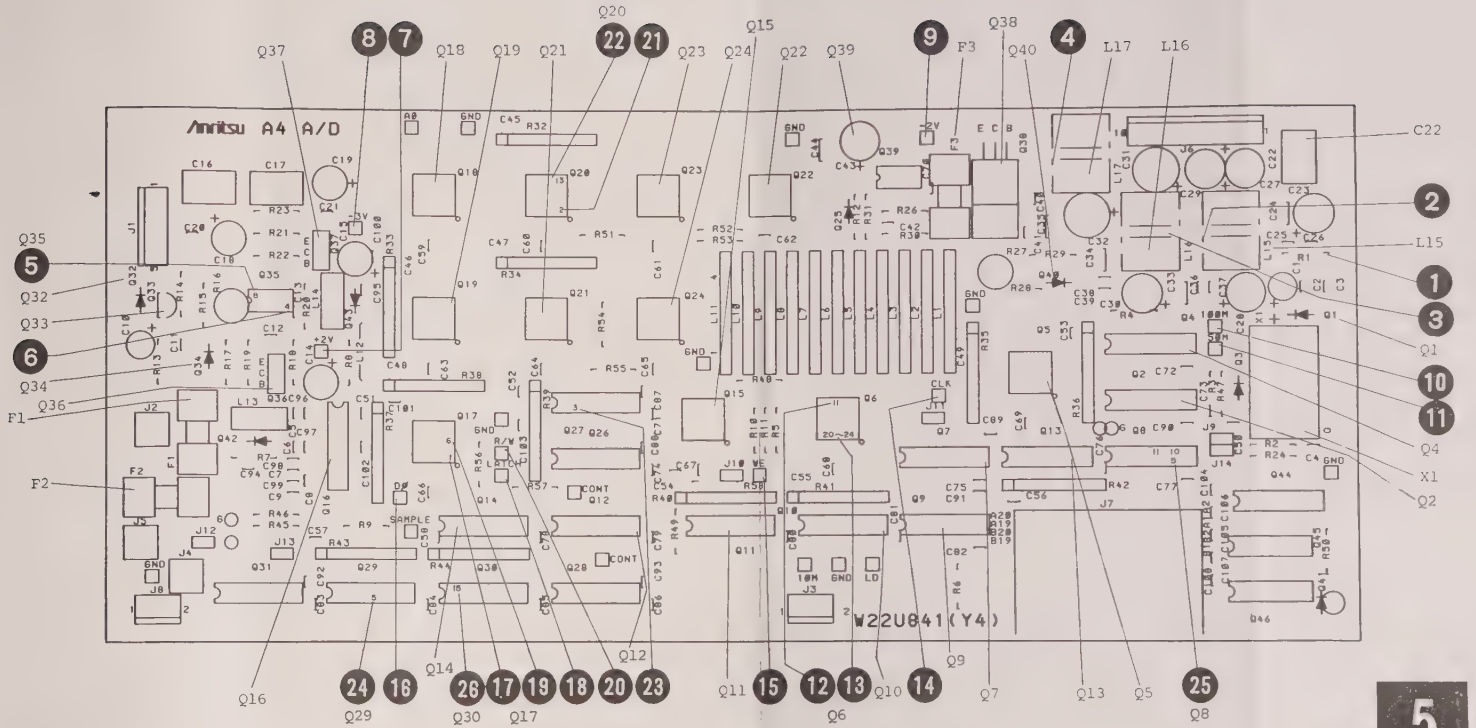
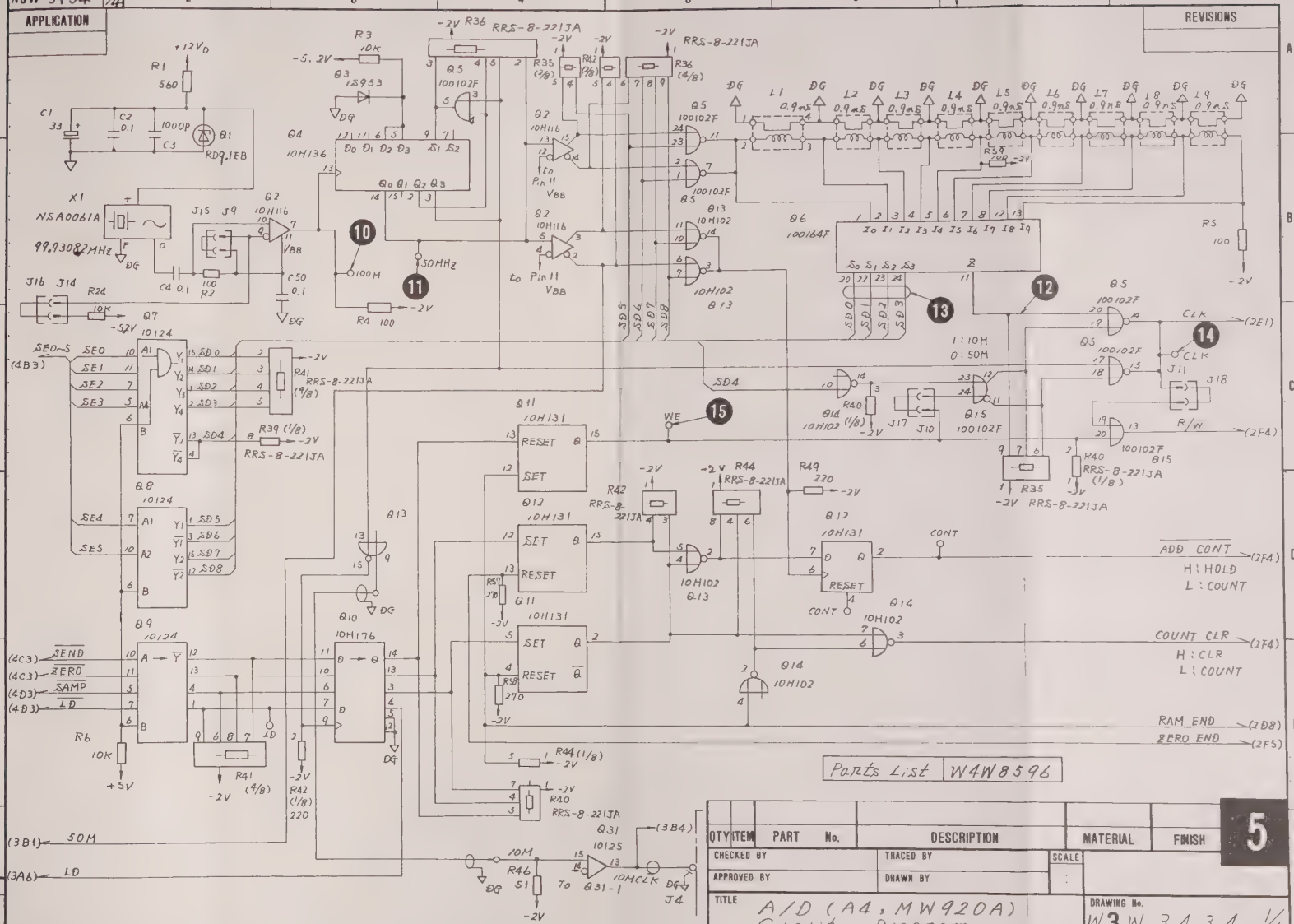
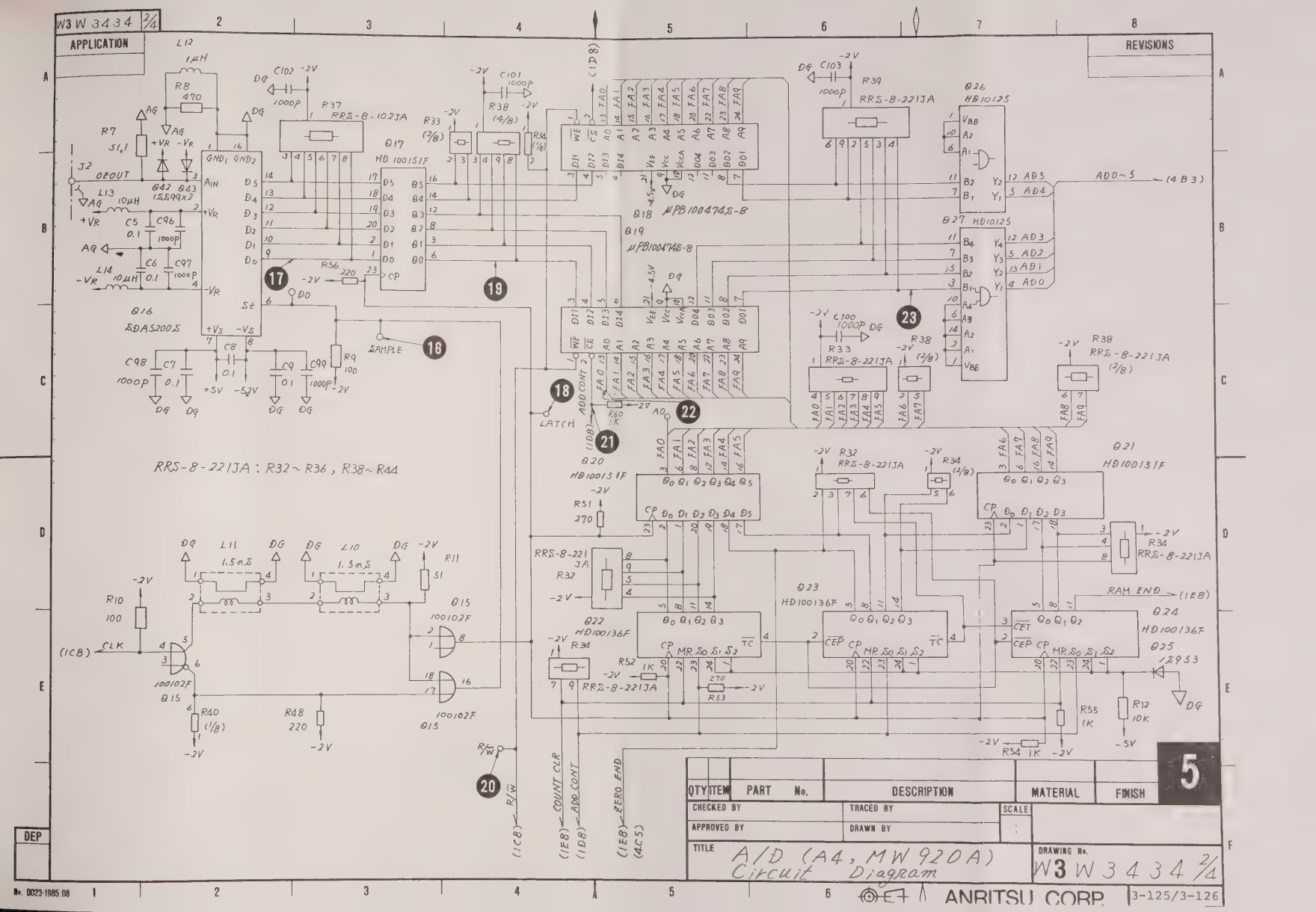
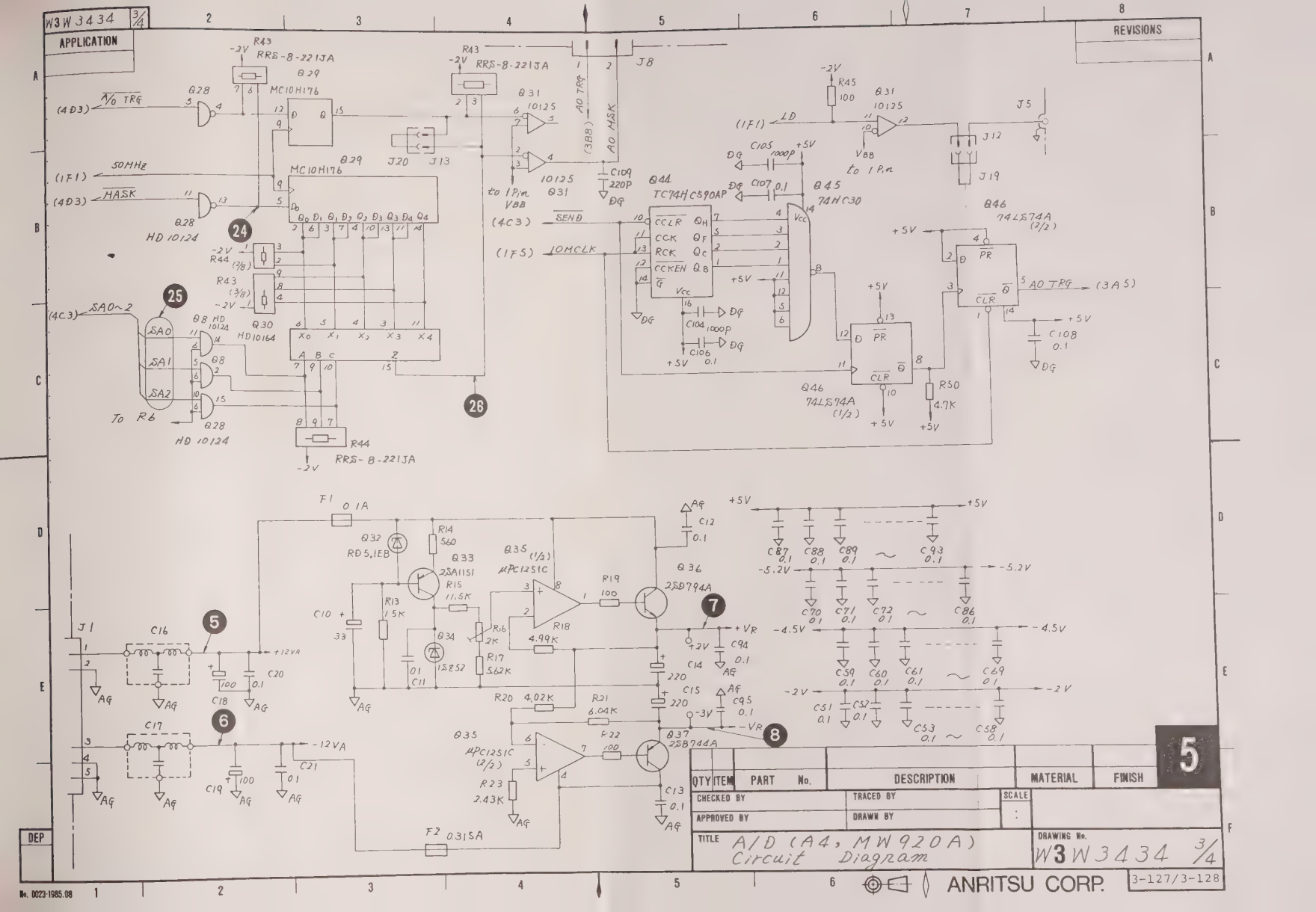


Fig. 3-9 A4 A/D PC Board
Parts Layout-Front Side


W3W 3434 1/4
APPLICATION
REVISIONS
+12V
-5.2V
-2V
-52V
+5V
50MHz
99.93082MHz
NSA0061A
RDQ-1EB
10H116
10H136
10H102
10H131
10H176
100102F
100164F
10124
10125
RRS-8-221JA
50M
10M
LD
SEND
ZERO
SAMP
SE0-5
SD0
SD1
SD2
SD3
SD4
SD5
SD6
SD7
SD8
WE
CONT
CLK
R/W
ADD CONT
H : HOLD
L : COUNT
COUNT CLR
H : CLR
L : COUNT
RAM END
ZERO END
Parts List W4W8596
DEP
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE
TITLE
A/D (A4, MW920A)
Circuit Diagram
DRAWING No.
W3W 3434 1/4
ANRITSU CORP.
3-123/3-124
No. 0023-1985.08


W3 W 3434 2/4
APPLICATION
REVISIONS
RRS-8-221JA : R32~R36, R38~R44
SAMPLE
LATCH
ADD CONT
COUNT CLR
ZERO END
A/D (A4, MW920A)
Circuit Diagram
W3 W 3434 2/4
ANRITSU CORP
3-125/3-126
DEP
No. 0023-1985.08


W3W3434 3/4
APPLICATION
REVISIONS
R43 RRS-8-221JA
-2V
Q29
MC10H176
Q28
HD 10124
Q30
HD10164
Q31
10125
Q44
TC74HC590AP
Q45
74HC30
Q46
74LS74A
J8
J5
J12
J19
J20
J13
R44
R45
R50 4.7K
C105 1000P
C107 0.1
C104 1000P
C106 0.1
C108 0.1
C109 220P
(4D3) A/D TRG
(4D3) MASK
(1F1) 50MHz
(1F1) LD
(4C3) SEND
(1F5) 10MCLK
(4C3) SA0~2
SA0
SA1
SA2
To R6
to I.P.n
VBB
AO TRG
AO MASK
(3A5)
+5V
-5V
-4.5V
-2V
-3V
+12VA
-12VA
+VR
AG
F1 0.1A
F2 0.315A
Q32 RD5.1EB
Q33 2SA1151
Q34 1S252
Q35 μPC1251C
Q36 2SD794A
Q37 2SB744A
R13 1.5K
R14 560
R15 11.5K
R16 2K
R17 5.62K
R18 4.99K
R19 100
R20 4.02K
R21 6.04K
R22 100
R23 2.43K
C10 33
C11 .01
C12 0.1
C13 0.1
C14 220
C15 220
C16
C17
C18 100
C19 100
C20 0.1
C21 0.1
C87 0.1
C88 0.1
C89 0.1
C93 0.1
C70 0.1
C71 0.1
C72 0.1
C86 0.1
C59 0.1
C60 0.1
C61 0.1
C69 0.1
C51 0.1
C52 0.1
C53 0.1
C58 0.1
C94 0.1
C95 0.1
5
6
7
8
24
25
26
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE
TITLE A/D (A4, MW920A) Circuit Diagram
DRAWING No. W3W3434 3/4
DEP
No. 0023-1985.08
ANRITSU CORP.
3-127/3-128

3.6.6 A5 ENCODER 6

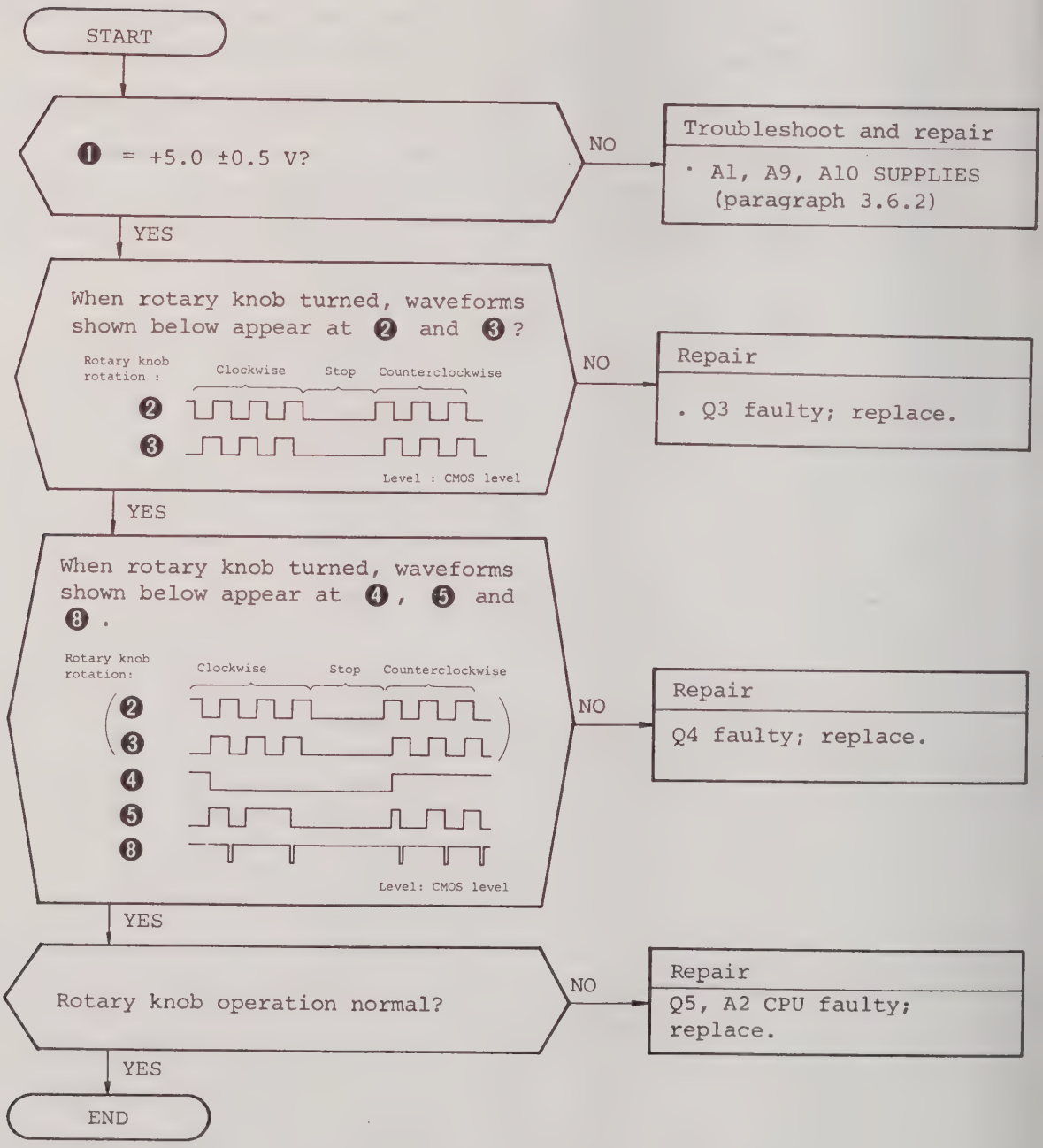
(1) Circuit description

This PC board consists of two sections: the encoder and controller, and the precessing section for key interrupts from the A6 KEY1 and A7 KEY2.

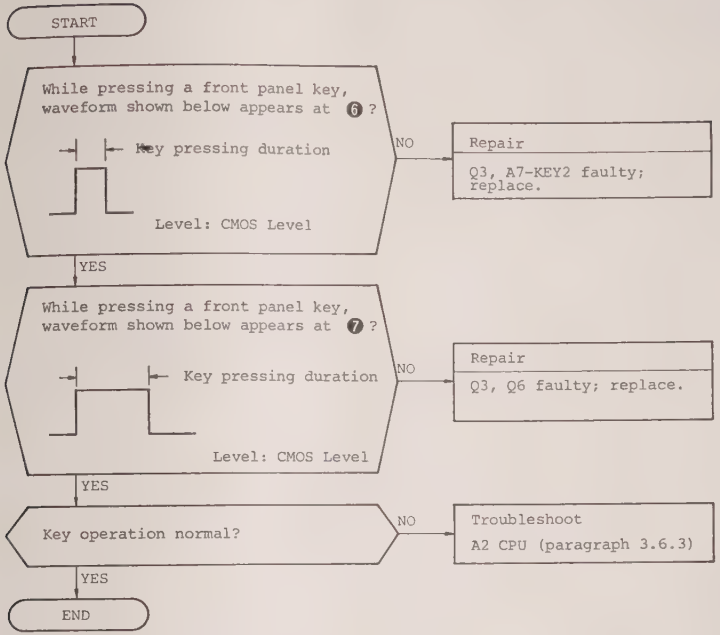
The encoder detects the speed and direction of rotation of the rotary knob on the front panel and transfers the detected data to the A2 CPU. The rotary knob encoder consists of an LED and phototransistor.

(2) Troubleshooting and repair

(a) Encoder troubleshooting and repair



(b) Key troubleshooting and repair



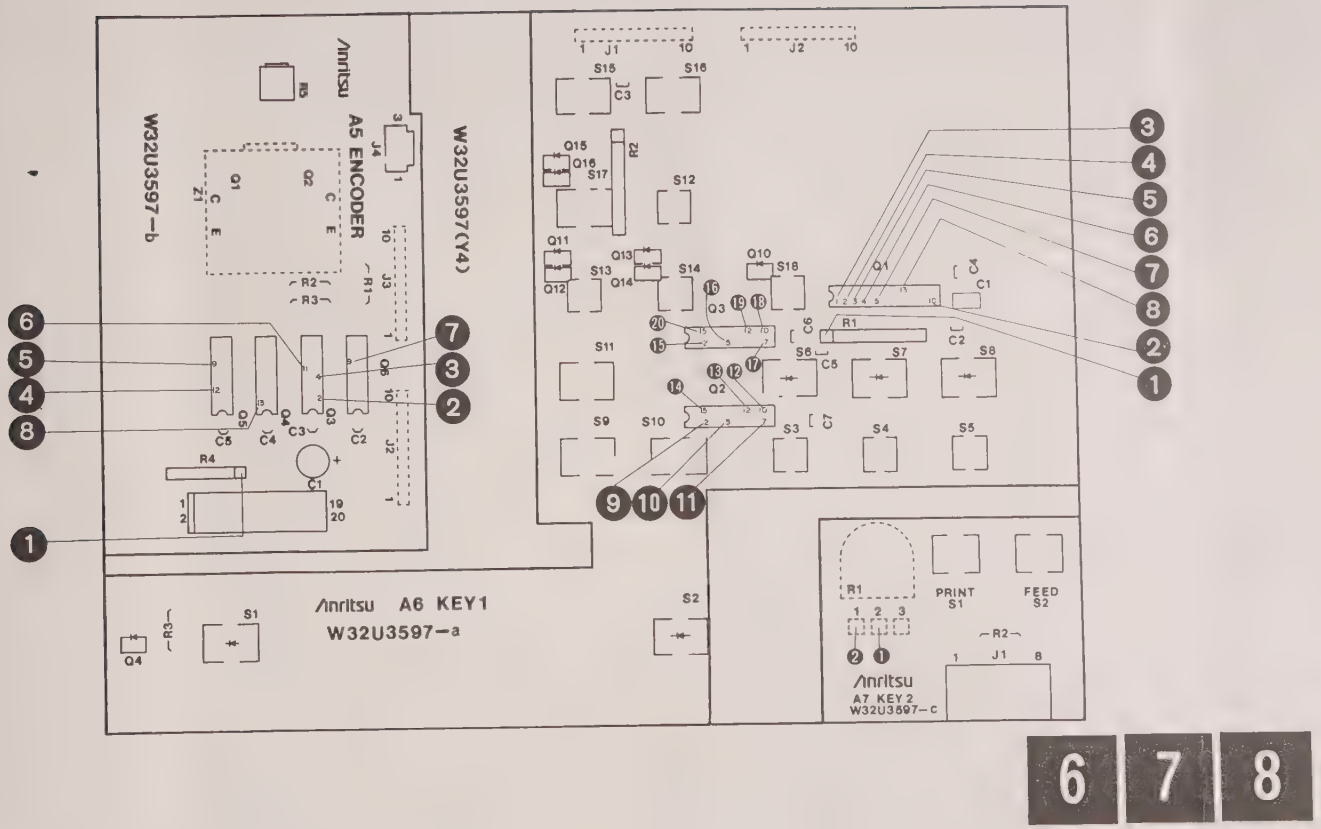
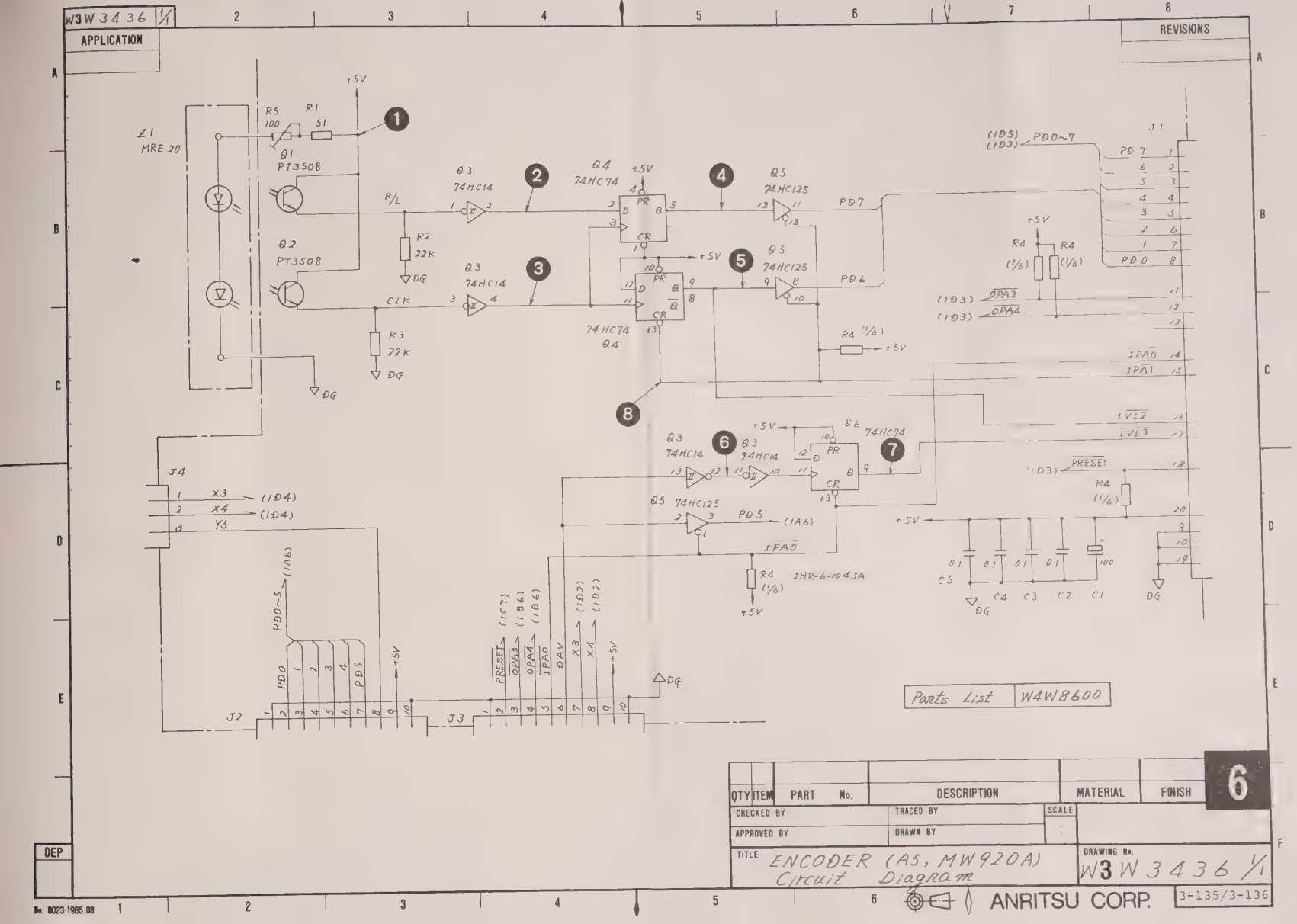


Fig. 3-10 A5 ENCODER/A6 KEY-1/A7 KEY-2
PC Board Parts Layout


W3W3436 1/1
APPLICATION
REVISIONS
Z1
MRE 20
R5 100
R1 51
Q1 PT350B
Q2 PT350B
R2 22K
R3 22K
DG
+5V
R/L
CLK
Q3 74HC14
Q4 74HC74
Q5 74HC125
Q6 74HC74
PD7
PD6
PD5
PD0~7
(1D5)
(1D2)
J1
R4 (1/6)
(1D3)
OPA3
OPA4
IPA0
IPA1
LVI2
LVI3
PRESET
J4
X3 → (1D4)
X4 → (1D4)
Y5
J2
J3
PD0
PD5
(1A6)
(1C7)
(1B6)
(1D2)
DAV
IHR-6-104JA
C1 100
C2 .01
C3 .01
C4 .01
C5 .01
Parts List W4W8600
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
TRACED BY
APPROVED BY
DRAWN BY
SCALE
TITLE ENCODER (A5, MW920A) Circuit Diagram
DRAWING No. W3W3436 1/1
ANRITSU CORP.
3-135/3-136
DEP
No. 0023-1985.08

3.6.7 A6 KEY-1 7

(1) Circuit description

This PC board consists of the front panel keys and LEDs. The pressed-key data is sent to the A2 CPU as CMOS level and the processing corresponding to that key is performed (LED lighting or AVERAGE processing, etc.).

(2) Troubleshooting and repair

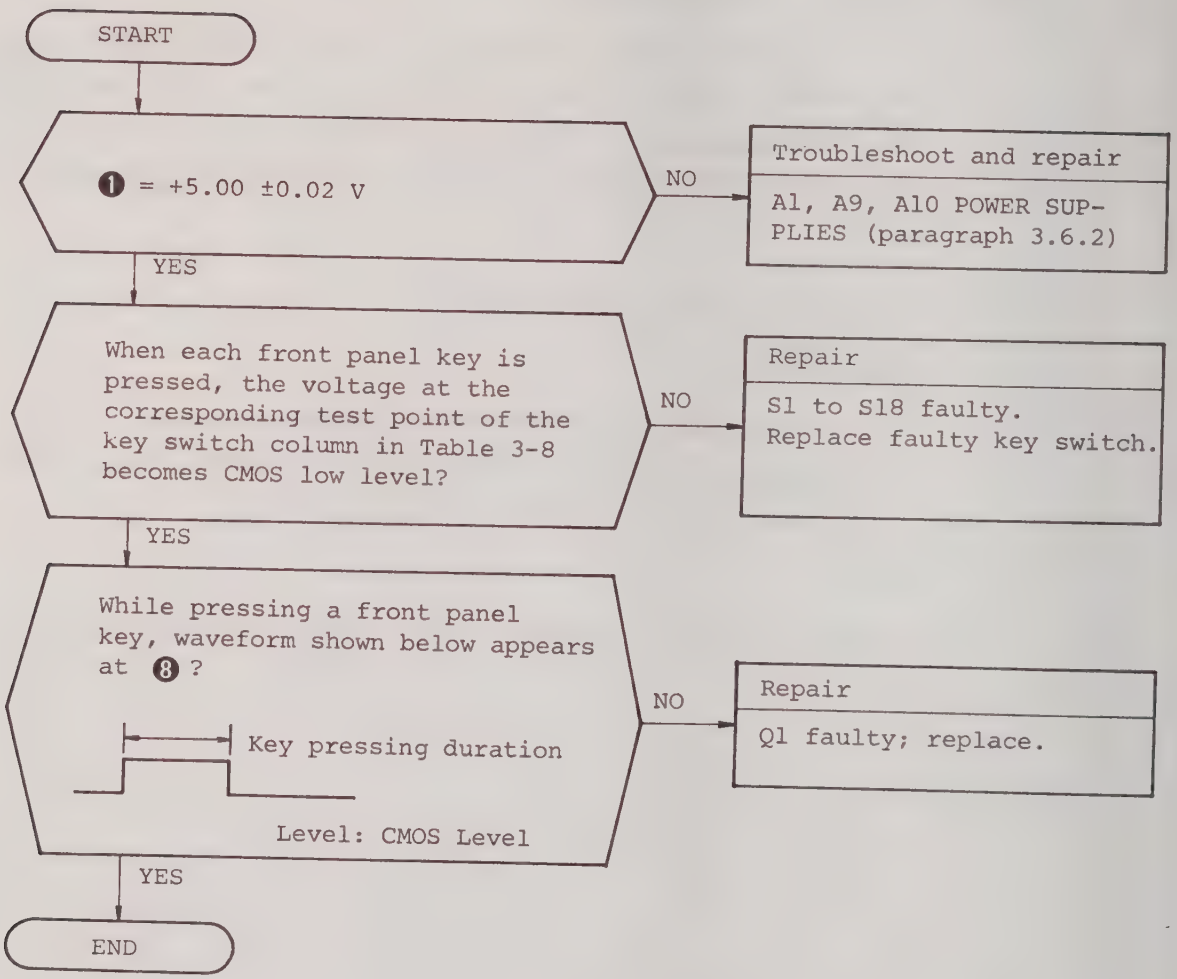
Preparation:

Disassemble the MW920A in accordance with the instructions in SECTION 2 and remove the front frame (20) as shown in Fig. 2-4.

Note:

See Fig. 3-10 for the A6 PC board parts layout.

(a) Key troubleshooting and repair


START
❶ = +5.00 ±0.02 V
NO
Troubleshoot and repair
A1, A9, A10 POWER SUPPLIES (paragraph 3.6.2)
YES
When each front panel key is pressed, the voltage at the corresponding test point of the key switch column in Table 3-8 becomes CMOS low level?
NO
Repair
S1 to S18 faulty.
Replace faulty key switch.
YES
While pressing a front panel key, waveform shown below appears at ❽ ?
Key pressing duration
Level: CMOS Level
NO
Repair
Q1 faulty; replace.
YES
END

(b) LED troubleshooting and repair

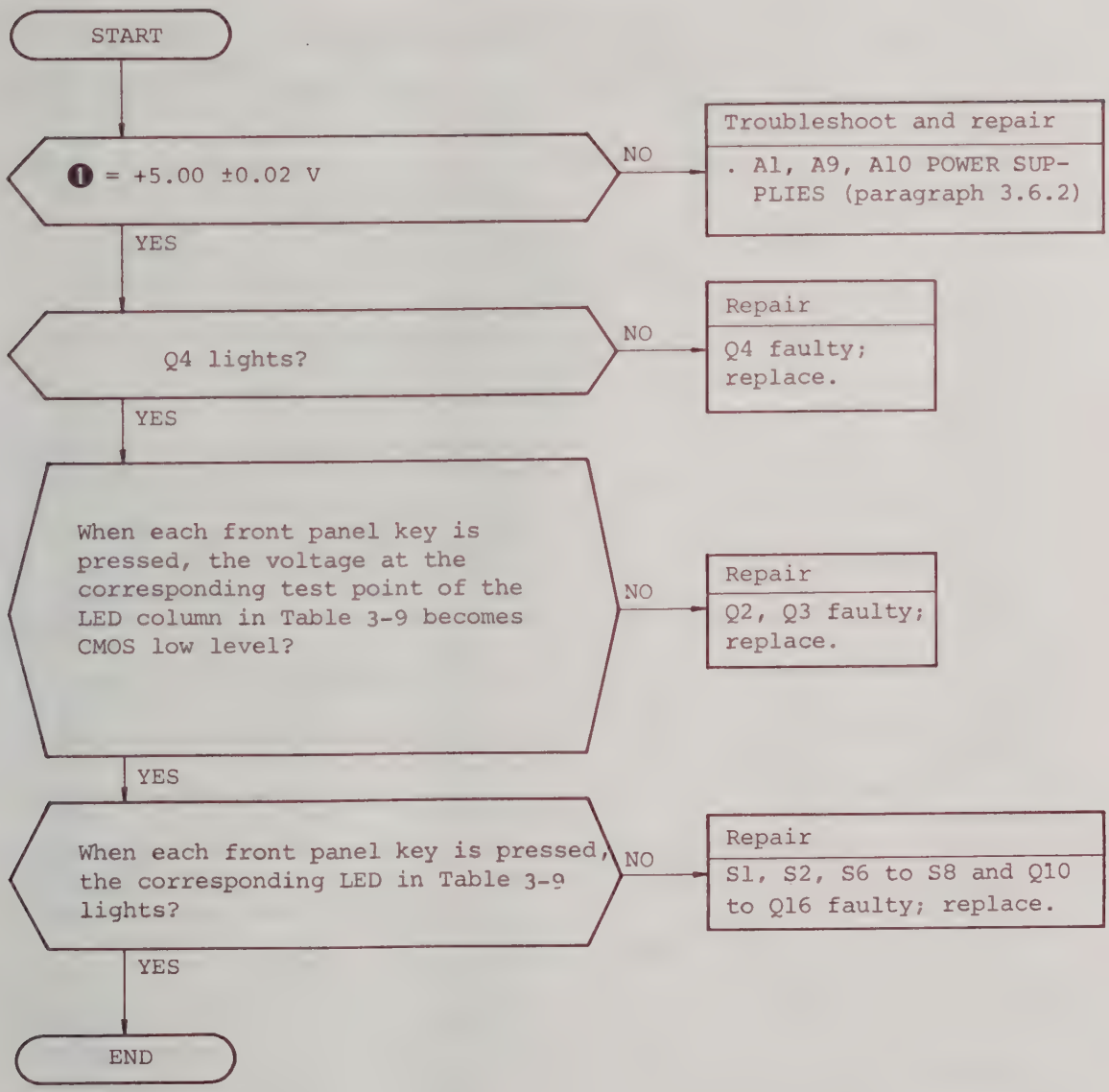
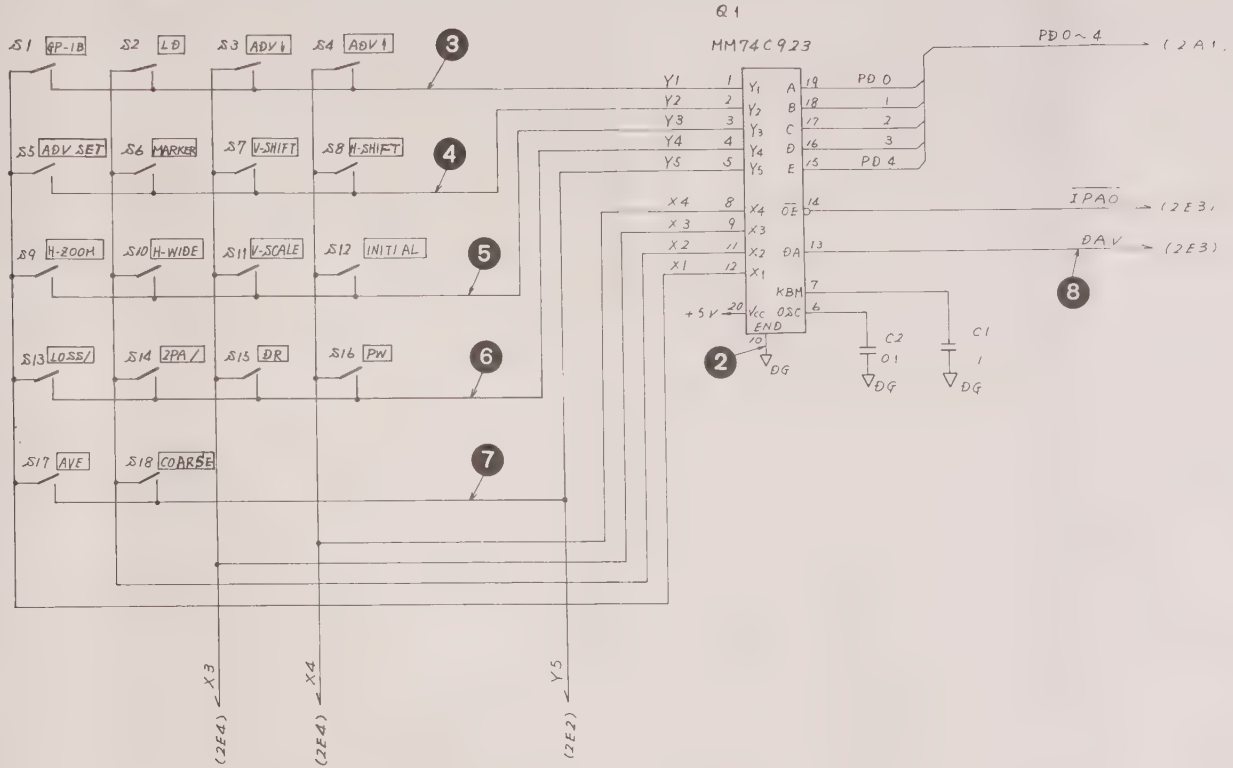

START
❶ = +5.00 ±0.02 V
NO
Troubleshoot and repair
. A1, A9, A10 POWER SUPPLIES (paragraph 3.6.2)
YES
Q4 lights?
NO
Repair
Q4 faulty; replace.
YES
When each front panel key is pressed, the voltage at the corresponding test point of the LED column in Table 3-9 becomes CMOS low level?
NO
Repair
Q2, Q3 faulty; replace.
YES
When each front panel key is pressed, the corresponding LED in Table 3-9 lights?
NO
Repair
S1, S2, S6 to S8 and Q10 to Q16 faulty; replace.
YES
END

Table 3-9 Relationship between Front Panel Keys, A6 Test Points, A6 Key Switches, A6 LEDs, and A6 Signal Names

Front Panel Key	A6 KEY-1 PC Board				
	Key Switch		LED		
	No.	Test Point	No.	Test Point	Signal Name
POWER	—	—	Q4		———
GP-IB	S1	❸	S1	❾	LN0 (GP-IB)
LD	S2		S2	❿	LN1 (LD)
ADV ↓	S3				
ADV ↑	S4				
ADV SET	S5	❹			
MARKER	S6		S6	⓫	LN2 (MARKER)
V-SHIFT	S7		S7	⓬	LN3 (V-SHIFT)
H-SHIFT	S8		S8	⓭	LN4 (H-SHIFT)
H-ZOOM	S9	❺			
H-WIDE	S10				
V-SCALE	S11				
INITIAL	S12				
SPLICE/LOSS	S13	❻	Q11	⓯	LN6 (SPLICE)
			Q12	⓰	LN7 (LOSS)
LSA/2 POINTS	S14		Q13	⓱	LN8 (LSA)
			Q14	⓲	LN9 (2 POINTS)
DR	S15				
PW	S16				
AVE	S17	❼	Q15	⓳	LN10 (ON)
			Q16	⓴	LN11 (OFF)
COARSE	S18		Q10	⓮	LN5

APPLICATION

REVISIONS



Note:
See Fig. 3-10 for PC board parts layout.

Parts List W4W8604

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY | TRACED BY | SCALE
APPROVED BY | DRAWN BY | :

TITLE: KEY-1 (A6, MW920A) Circuit Diagram

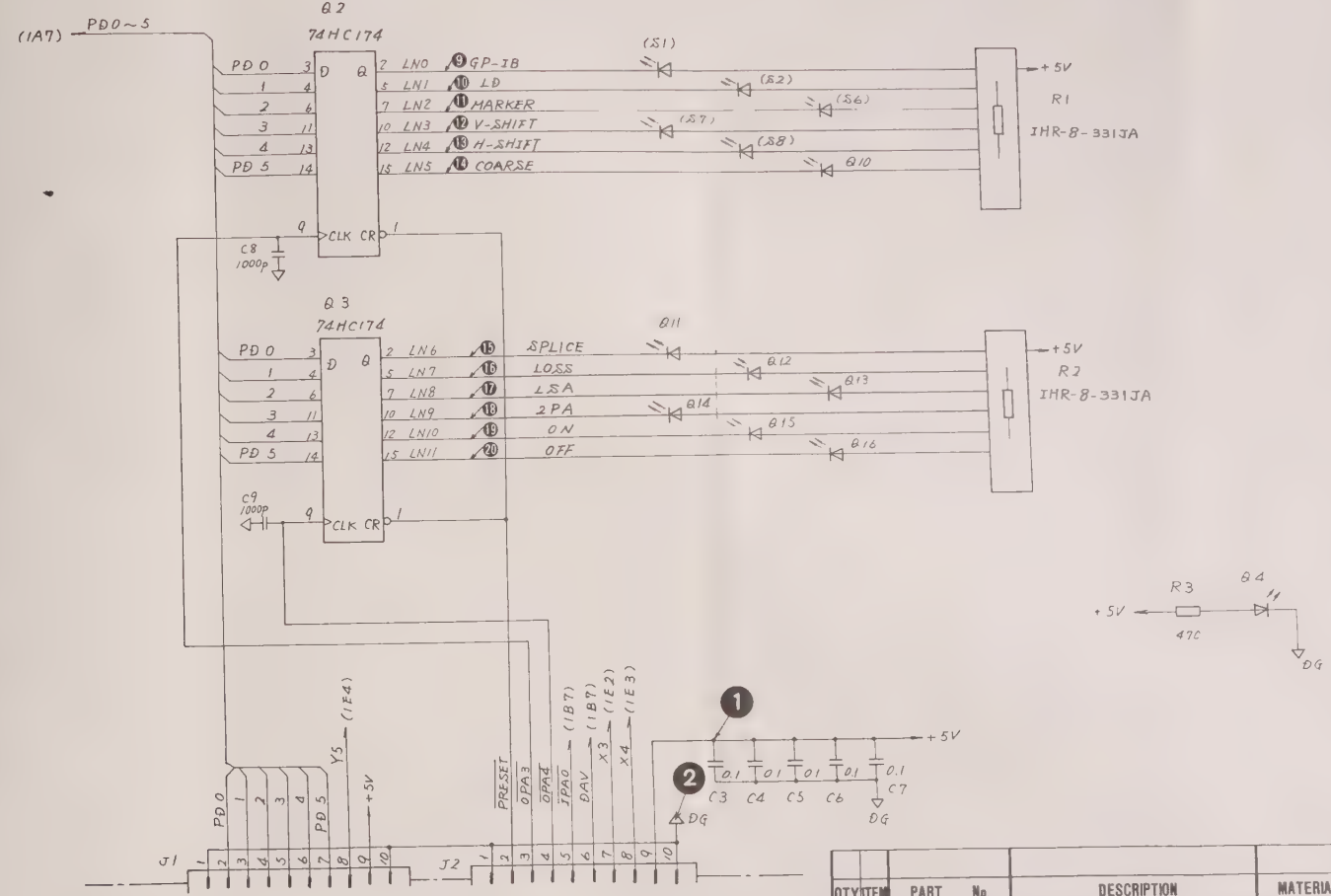
DRAWING No. W3W3438 1/2

7

DEP

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

7

CHECKED BY	TRACED BY	SCALE	M-1
APPROVED BY	DRAWN BY		

TITLE KEY-1 (A6, MW920A) Circuit Diagram

DRAWING No. W3W3438 2/2

ANRITSU CORP.

3-143/3-144

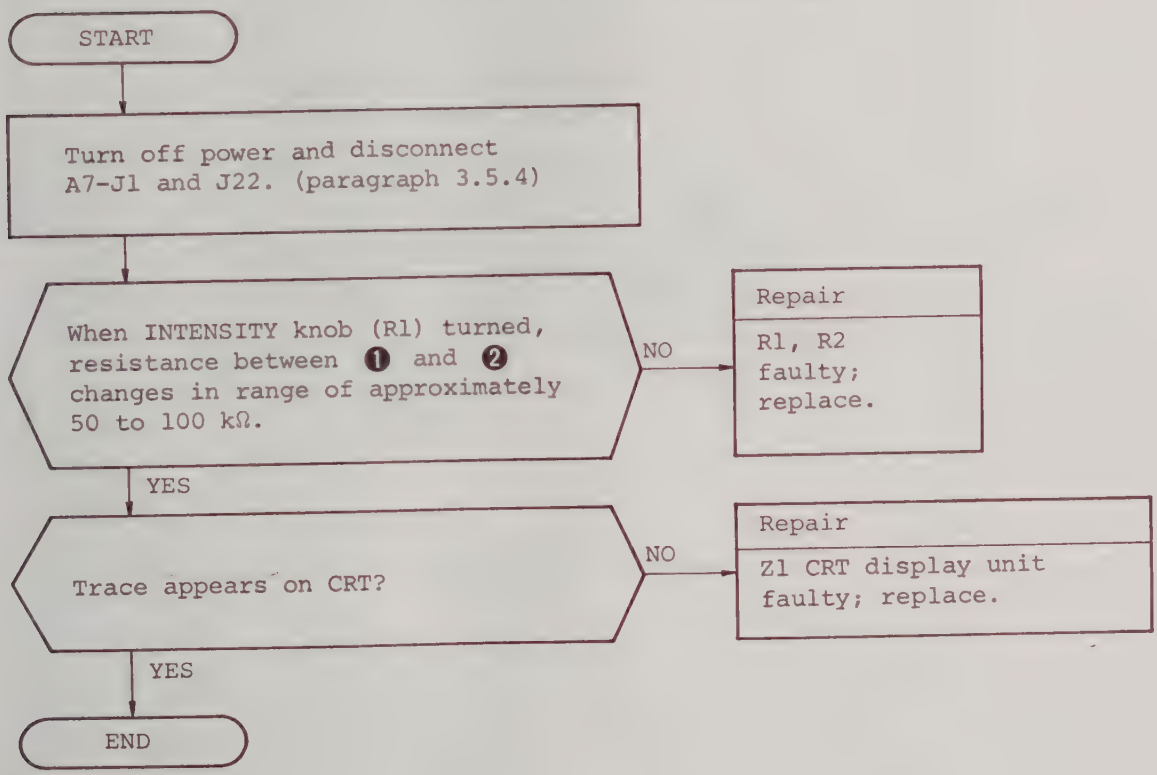
DEP

3.6.8 A7 KEY-2 8

(1) Circuit description

This PC board contains the printer PRINT and FEED key switches and CRT INTENSITY variable resistor.

(2) Troubleshooting and repair



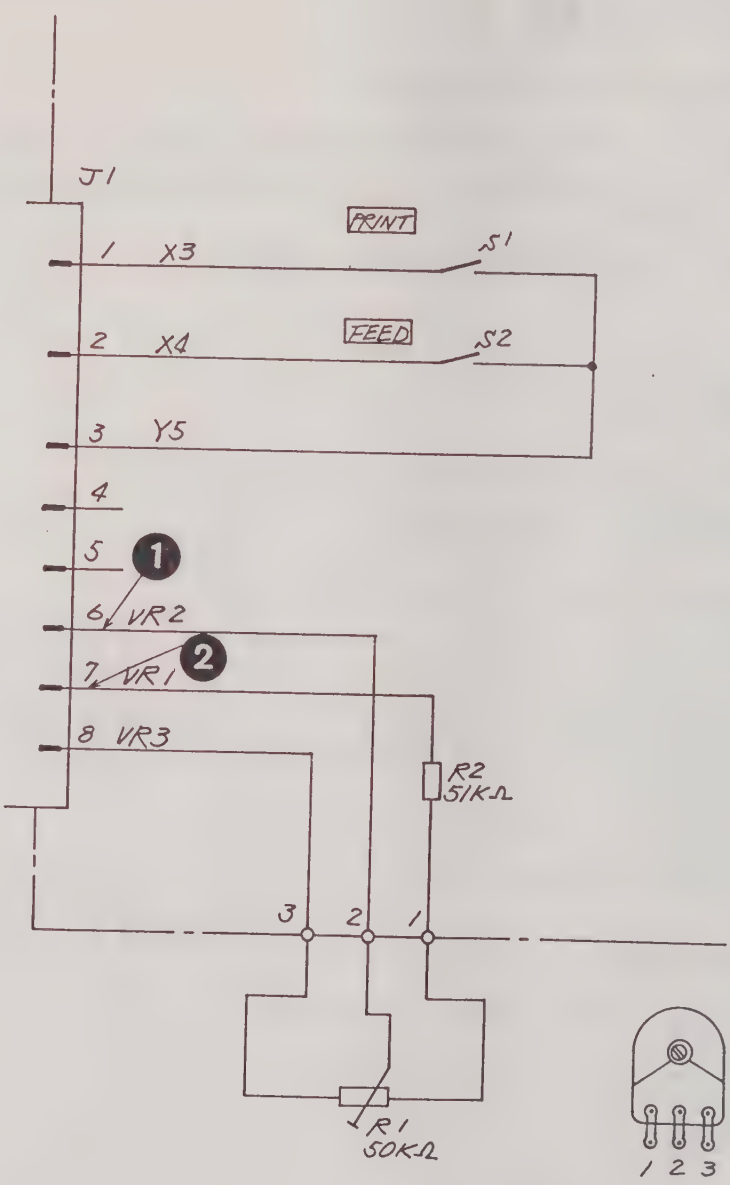
Note:

See Fig. 3-10 for PC board parts layout.

W4W 8655	1/1

APPLICATION

REVISIONS



Parts List	W4W8608

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

8

CHECKED BY	TRACED BY	SCALE
APPROVED BY	DRAWN BY	:

DEP

TITLE: KEY-2 (A7, MW920A) CIRCUIT DIAGRAM

DRAWING No. W4W 8655 1/1

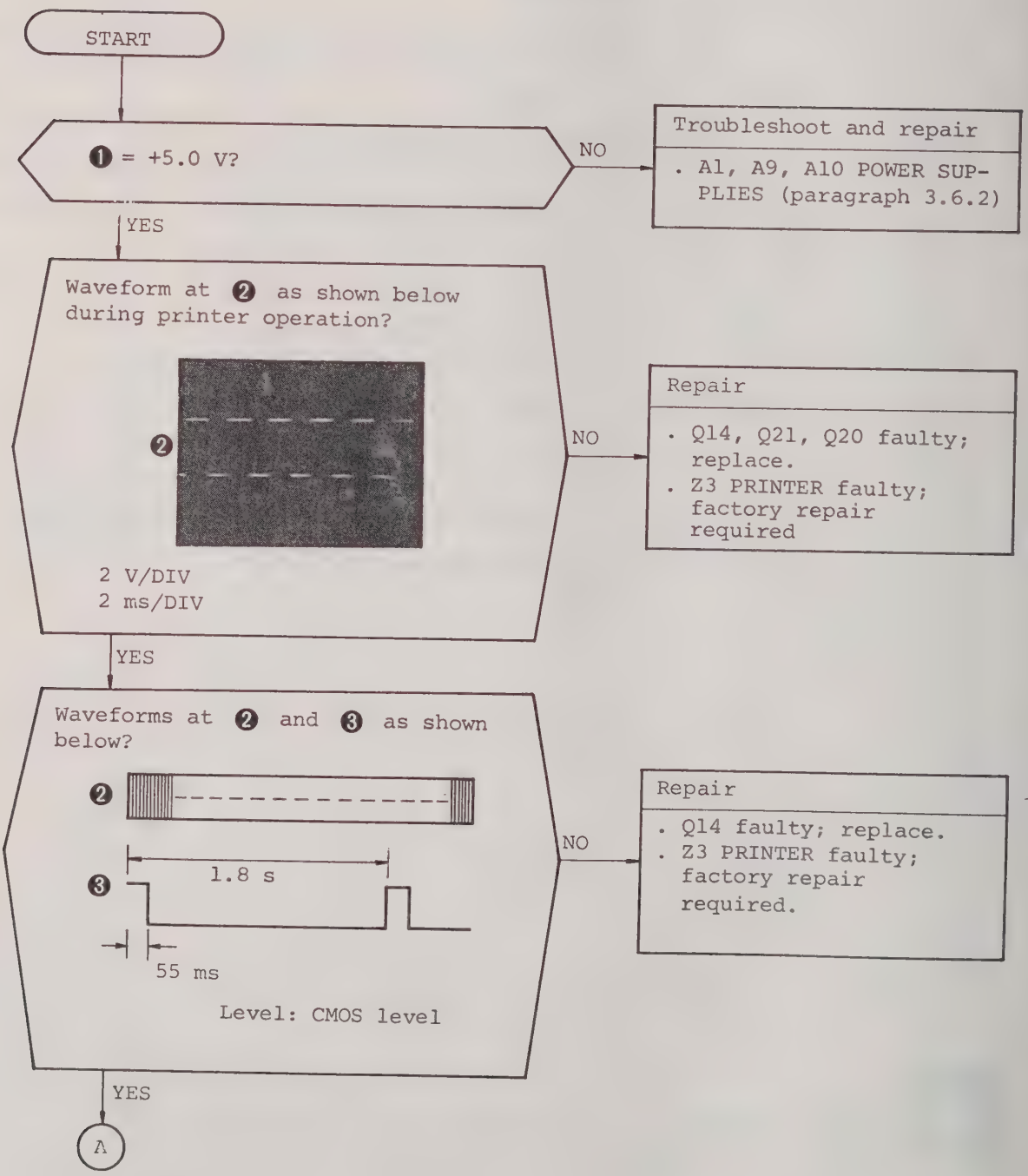
3.6.9 A8 PRINTER IF 9

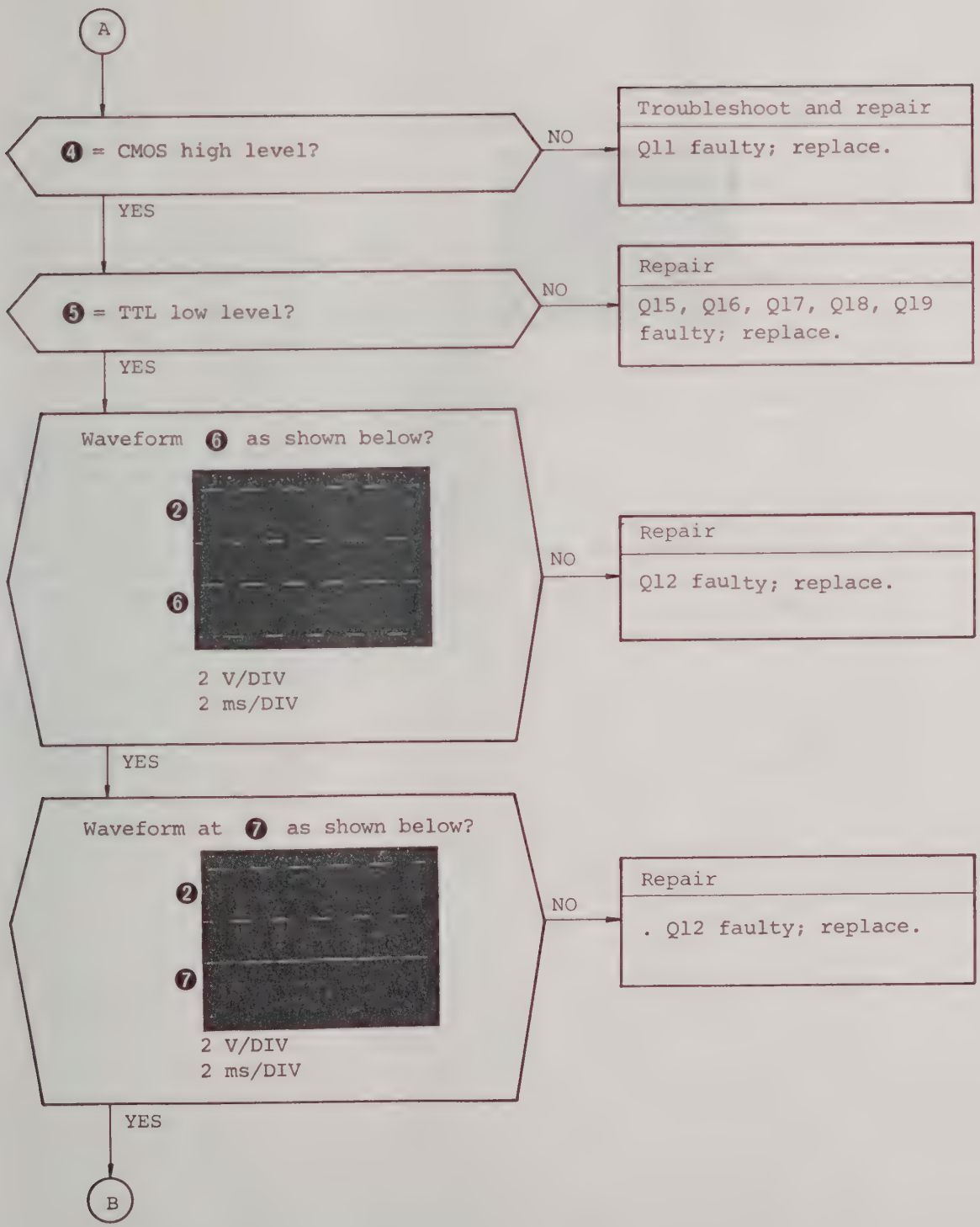
(1) Circuit description

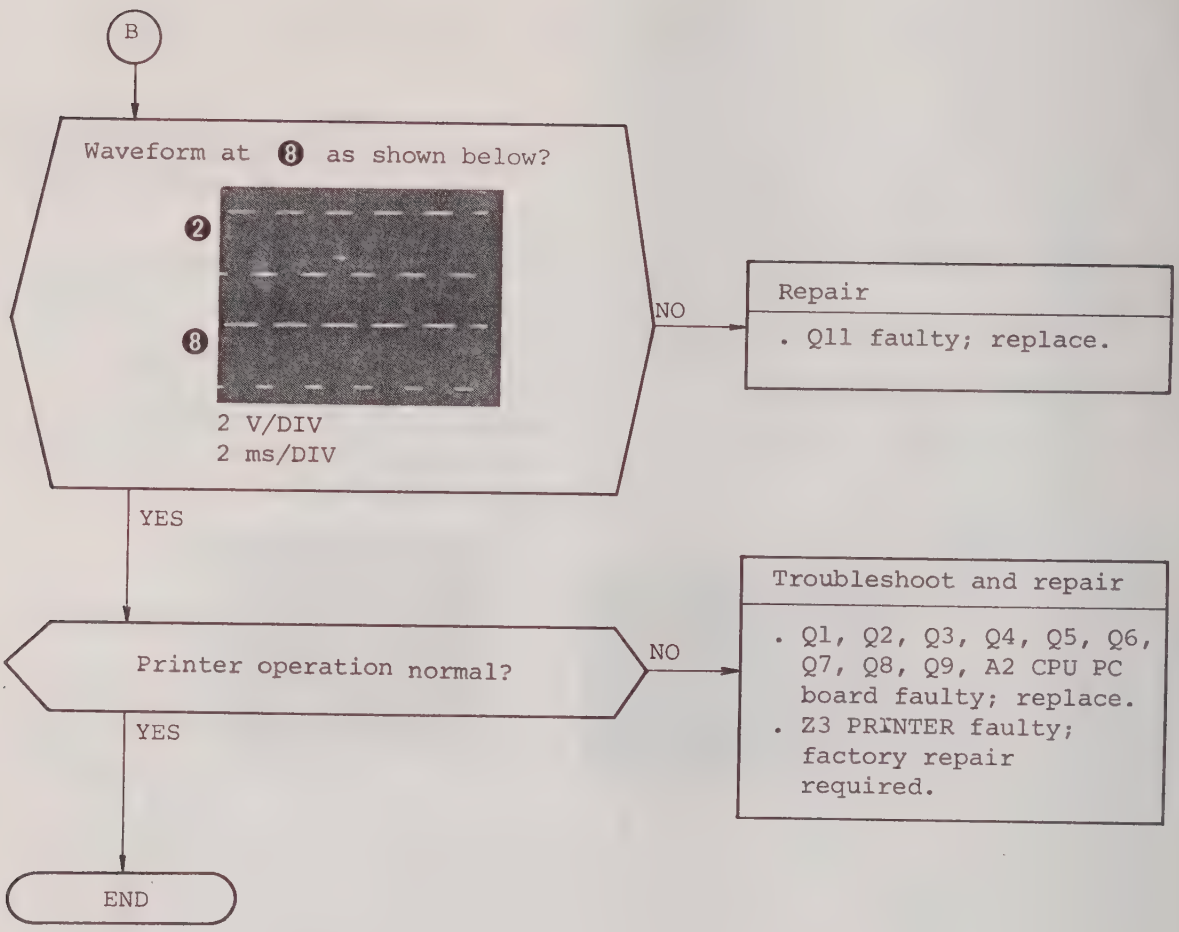
This PC board consists of the printer interface circuit.

The printer interface drives the Z3 PRINTER. When the signal "MSW" is made CMOS low level, +5 V is applied to the printer monitor and the motor operates. At this time, the motor generates trigger "TG". The output port (Q1) output is latched at Q2 and Q3 by using this trigger and the printer print data is created. The monostable multivibrator Q12 is controlled so that power over the specified value is not applied to the printer head. The signal "HM" detects that the head of the thermal printer is at the home position and places the head at a fixed position after printer operation.

(2) Troubelshooting and repair




A
❹ = CMOS high level?
NO
Troubleshoot and repair
Q11 faulty; replace.
YES
❺ = TTL low level?
NO
Repair
Q15, Q16, Q17, Q18, Q19 faulty; replace.
YES
Waveform ❻ as shown below?
❷
❻
2 V/DIV
2 ms/DIV
NO
Repair
Q12 faulty; replace.
YES
Waveform at ❼ as shown below?
❷
❼
2 V/DIV
2 ms/DIV
NO
Repair
. Q12 faulty; replace.
YES
B


B
Waveform at ❽ as shown below?
❷
❽
2 V/DIV
2 ms/DIV
NO
Repair
. Q11 faulty; replace.
YES
Printer operation normal?
NO
Troubleshoot and repair
. Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, A2 CPU PC board faulty; replace.
. Z3 PRINTER faulty; factory repair required.
YES
END

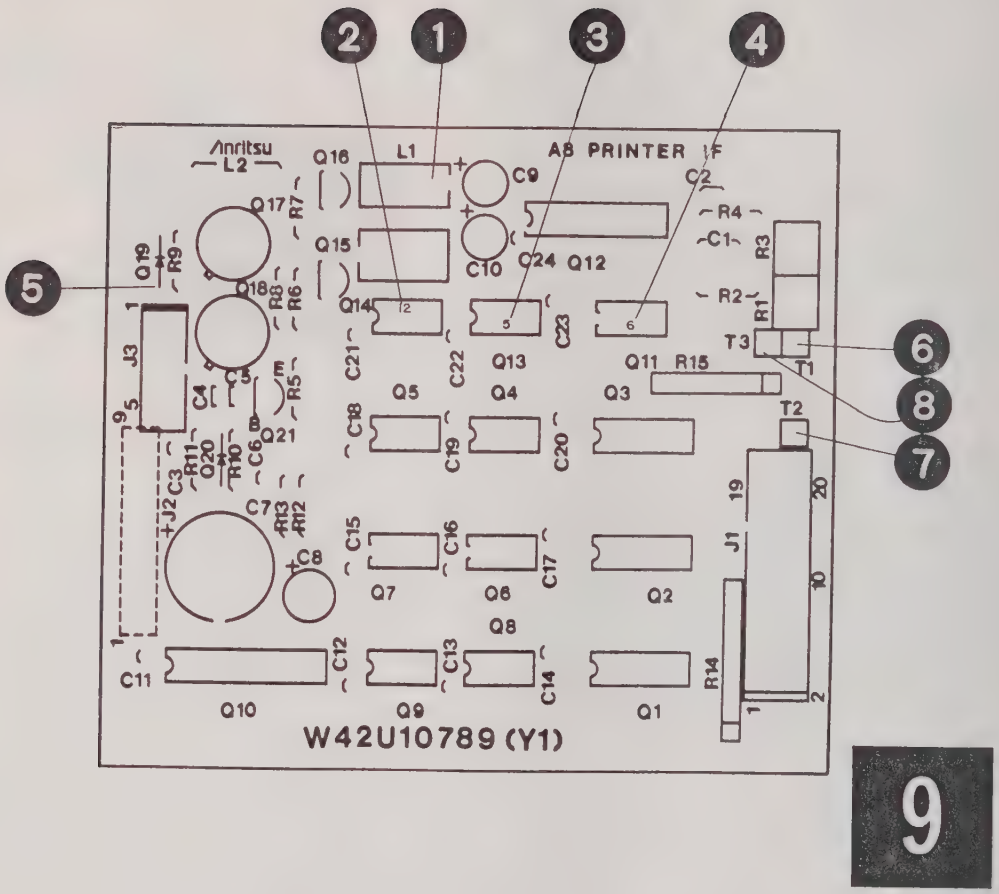
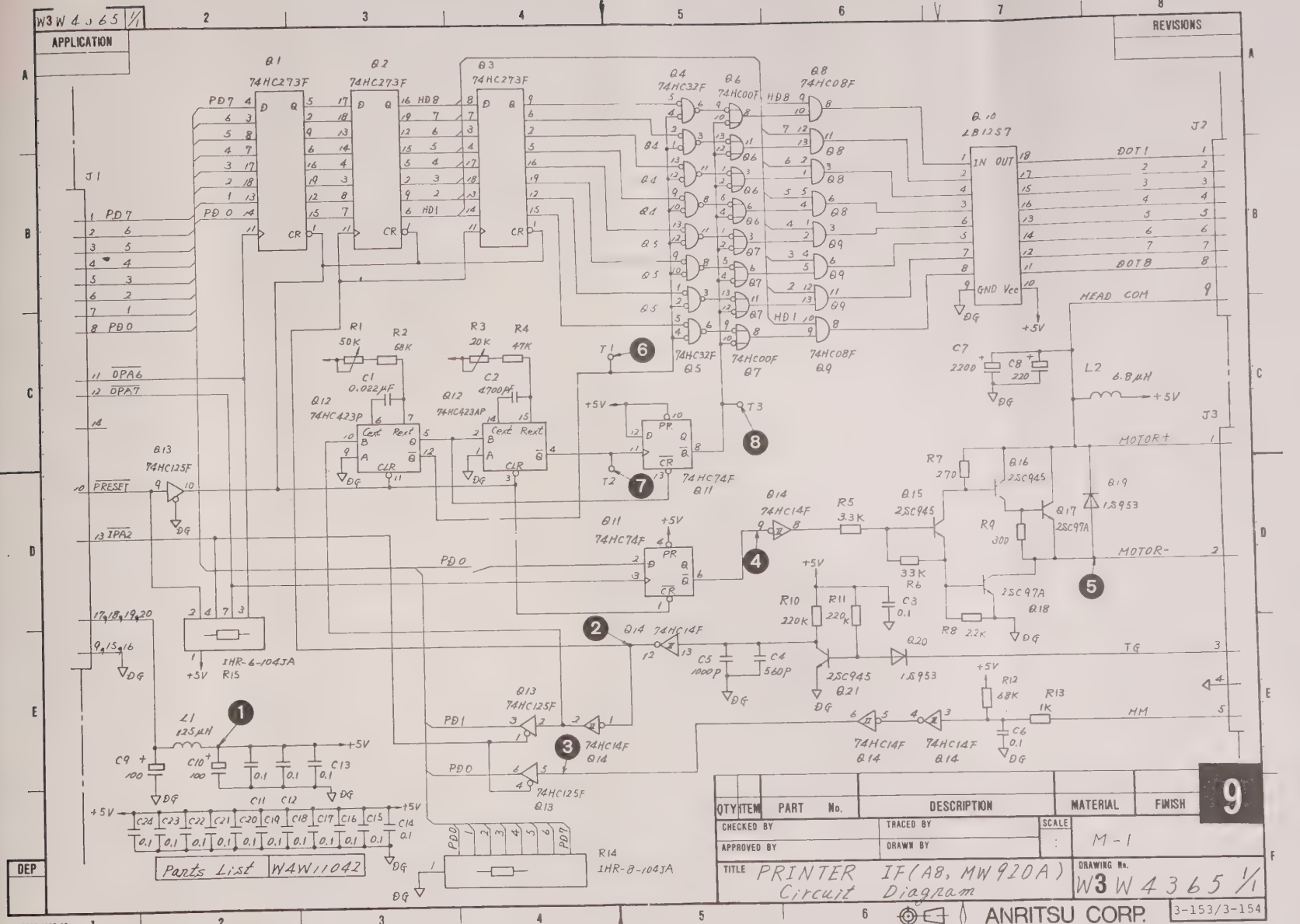


Fig. 3-11 A8 PRINTER IF PC Board Parts Layout


W3W4365 1/1
APPLICATION
REVISIONS
Q1 74HC273F
Q2 74HC273F
Q3 74HC273F
Q4 74HC32F
Q6 74HC00F
Q8 74HC08F
Q10 LB1257
J1
J2
J3
PD7
PD0
HD8
HD1
OPA6
OPA7
PRESET
IPA2
DOT1
DOT8
HEAD COM
MOTOR+
MOTOR-
TG
HM
R1 50K
R2 68K
R3 20K
R4 47K
C1 0.022μF
C2 4700PF
Q12 74HC423P
Q12 74HC423AP
Q13 74HC125F
Q14 74HC14F
Q11 74HC74F
T1
T2
T3
R5 3.3K
R6 33K
R7 270
R9 300
R10 220K
R11 220K
R12 68K
R13 1K
R8 2.2K
C3 0.1
C4 560P
C5 1000P
C6 0.1
C7 2200
C8 220
L1 125μH
L2 6.8μH
Q15 2SC945
Q16 2SC945
Q17 2SC97A
Q18 2SC97A
Q19 1S953
Q20 1S953
Q21 2SC945
IHR-6-104JA R15
IHR-8-104JA R14
+5V
DG
Parts List W4W11042
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE M-1
TITLE PRINTER IF(A8, MW920A) Circuit Diagram
DRAWING No. W3W4365 1/1
ANRITSU CORP.
3-153/3-154
DEP
9

SECTION 4

ADJUSTMENT

4.1 Introduction

This section describes how to adjust the MW920A after repair.

The MW920A adjustment points step sequence and the contents are summarized in Table 4-1. If this step sequence is not followed, prior adjustments may be disturbed. The required equipment is the same as the test equipment recommended for troubleshooting shown in Table 3-2.

The following PC boards do not have any adjustment points:

1. A3 ADD
2. A6 KEY-1
3. A7 KEY-2
4. A9 POWER SUPPLY-2

Table 4-1 Adjustment Steps, Points, and Contents

Step	PC board	Adjustment point	Required equipment	Adjustment contents (associated paragraph)
1	A1 POWER SUPPLY-1 A10 POWER SUPPLY-2	A1-R10 A1-R15 A1-R25 A1-R30 A10-R10 A10-R20 A10-R30 A10-R55 A10-R49	Digital multimeter	DC power supply voltage adjustment (paragraph 4.2.1)
2	A4 A/D	R16 R27	Digital multimeter	DC voltage adjustment (paragraph 4.2.2)
3	Z1 CRT DISPLAY UNIT	A7-R1		Brightness, focus, and V-height adjustment (paragraph 4.2.3)
4	A5 ENCODER	R5		Rotary encoder adjustment (paragraph 4.2.4)
5	A8 PRINTER IF	R1 R3	Oscilloscope	Printer intensity adjustment Printing width adjustment (paragraph 4.2.5)
6	A2 CPU	C6	Frequency counter	Timer IC clock frequency adjustment (paragraph 4.2.6)

4.2 Adjustment Procedure

4.2.1 A1 POWER SUPPLY-1 2 and A10 POWER SUPPLY-2 11

The A1/A10 POWER SUPPLY adjustment adjusts the dc power supply voltages.

CAUTION:

To prevent shorting the circuit, do not touch other PC boards or the cabinet.

Setup:

1. Disconnect the connection between the A1-J7 and A2-J1 connectors. Similarly, disconnect the connections between the A1-J10 and A4-J6 connectors, and between A1-J3 and A4-J1 connectors.
2. Do not disconnect the connectors between the A1, A9 and A10 PC boards.

Adjustment:

Step	Procedure
1	Set the POWER switch to ON.
2	Adjust each dc power supply voltage in accordance with Table 4-2 as follows: (a) Connect the digital multimeter between the specified test point and ground, then measure the dc voltage. (b) Adjust the voltage to the specified voltage with the specified variable resistor. (c) Turn off the power, and reconnect A1-J7 to A2-J1, and then turn on the power. (d) Repeat step 2.

Table 4-2 Adjustment of each DC Power Supply Voltage

Step	Name	Test point		Adjustment variable resistor	Specified output voltage	Remark
		Test point	Ground			
1	+5.0 VD	"+5 VD" A1 - ❶		A10-R10	+5.00 ±0.02 V	
2	+12.0 VD	"+12 VD" A1 - ❺		A10-R20	+12.00 ±0.02 V	
3	-12.0 VD	A1 - ㊳	"DG"	———	Typical	
4	-5.2 VD	"-5.2 VD" A1 - ❾		A10-R30	-5.2 ±0.2 V	
5	-4.5 VD	"-4.5 VD" A1 - ⓭		A10-R55	-4.5 ±0.2 V	Note 1
6	+12 VA	"+13.5 VA" A1 - ㉒		A1-R10	+13.5 ±0.1 V	
		"+12 VA" A1 - ⓰		A1-R15	+12.00 ±0.02 V	Note 2
7	-12 VA	"-13.5 VA A1 - ㉛	"AG"	A1-R25	-13.5 ±0.1 V	
		"-12 VA" A1 - ㉕		A1-R30	-12.00 ±0.02 V	Note 3
8	+24.0 VAO	"+24 VAO" A1 - ㉞	"GNDAO"	A10-R49	+24 ±0.05 V	

Notes:

1. After adjusting -5.2 VD, adjust -4.5 VD.
2. After adjusting +13.5 VA, adjust +12 VA.
3. After adjusting -13.5 VA, adjust -12 VA.
4. VA, VD, and VAO mean power supply voltages for analog, digital, and AO switch circuits, respectively.

4.2.2 A4 A/D 5

The A4 A/D adjustment adjusts the dc power supply voltages.

Caution:

. To prevent shorting the circuit, do not touch other PC boards or the cabinet.

Setup:

Check that A4-J6 to A1-J10, and A4-J1 to A1-J3 are connected as indicated in 1.

Adjustment:

Step	Procedure
1	Set the POWER switch to ON.
2	Adjust each dc voltage in accordance with Table 4-3 as follows: (a) Connect the digital multimeter between the specified test point and ground, then measure the dc voltage. (b) Adjust the voltage to the specified value with the specified variable resistor.

Table 4-3 A4 A/D Adjustment

Step	Name	Test point		Adjustment variable resistor	Specified output voltage
		Test point	Ground		
1	+2 V	❼	AG	R16	+2.00 ±0.02 V
2	-2 V	❾	DG	R27	-2.00 ±0.02 V

4.2.3 Z1 CRT DISPLAY unit

The Z1 CRT DISPLAY adjustment adjusts the brightness, focus and vertical (V) height.

Caution:

A high voltage is used in the CRT unit, be careful to avoid an accidental electric shock.

Setup:

Check that J17 to A2-J3 and A7-J1 are connected as indicated in 1.

Adjustment:

Step	Procedure
1	Set the POWER switch to ON.
2	Adjust the brightness as follows: (1) Rotate R1 (INTENSITY) of the A7 KEY-2 PC board near the Z3 printer fully clockwise. Use the SUB BRIGHT control shown in Fig. 4-1 to adjust the brightness so that a horizontal line is faintly displayed on the screen. (2) Adjust the brightness to medium intensity using R1 of the A7 KEY-2 PC board.
3	Adjust the focus as follows: While watching the CRT, adjust the FOCUS control shown in Fig. 4-1 to the position at which the bright spot on the CRT is clearest.
4	Adjust the vertical size as follows: Look straight at the CRT. Use the V. HEIGHT control shown in Fig. 4-1 to adjust the vertical height as indicated in Fig. 4-2.

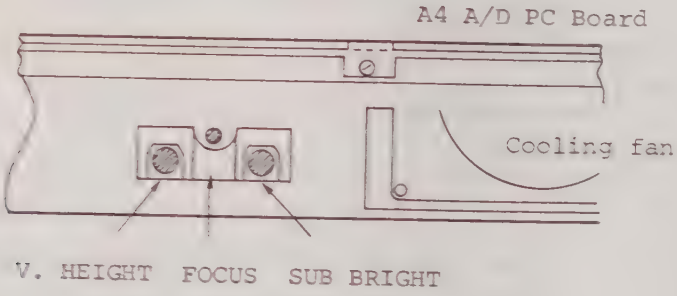


Fig. 4-1 Z1 CRT DISPLAY Adjustment Control Resistors

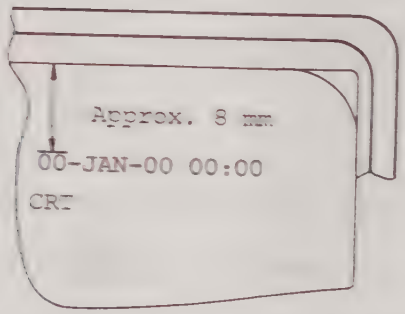


Fig. 4-2 V-HEIGHT Adjustment

4.2.4 A5 ENCODER 6

The A5 ENCODER adjustment prevents miscounting when the rotary knob is rotated.

Setup:

Check that A5-J1 and A2-J5 are connected as shown in 1 .

Adjustment:

Step	Procedure
1	Set the POWER switch to ON.
2	When the rotary knob is turned, adjust R5 so there is no miscount.

4.2.5 A8 PRINTER IF 9

The A8 PRINTER IF adjustment adjusts the character print intensity and print width.

Caution:

Insert the printer paper before starting printing.

Setup:

Confirm that connections between A2-J6 and A8-J1 and between A8-J3 and Z3 through J30 and between A8-J2 and Z3, shown in 1.

Adjustment:

Step	Procedure
1	Set the POWER switch to ON. Press the [PRINT] (S1) key to check that the printer hard-copies properly. Adjust the print intensity by adjusting the resistor R1. Measure the low level time of the pulse signal at check pin T1. Next measure the pulse at check pin T2 to adjust the resistor R3 so that the pulse width (high level) time is within 80% of the low level time at T1.

Table 4-4 A8 PRINTER IF Adjustment

Item	Check point	Adjusting resistor
Print intensity	T1	R1
Pulse width	T2	R3

4.2.6 A2 CPU 3

The A2 CPU adjustment adjusts the clock frequency for time indication.

Setup:

Confirm that the connection between A2-J1 and A1-J7 connectors are connected as indicated in 1.

Adjustment:

Step	Procedure
1	Turn the POWER switch on while pressing the [GP-IB] key on the front panel (A6 KEY-1 PC board).
2	Connect the frequency counter ⑲ shown in Fig. 3-5 and adjust A2-C6 so that the oscillation frequency is 1.024 kHz.

SECTION 5

REPLACEABLE PARTS

5.1 Introduction

This section describes how to order replacement parts. The following table shows circuit references (CKT REF) and abbreviations used for items in the Parts Lists. The quantity of each item in the Parts List is "one" unless another value is given in the "NOTE" column.

(1) Circuit references

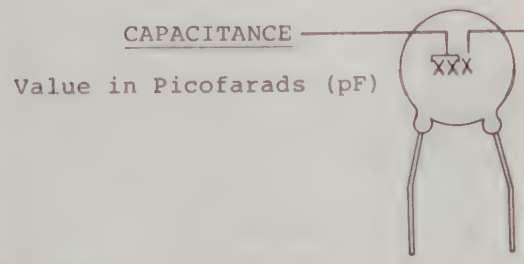
AT:	Attenuator	K:	Relay	Q:	Transistor, diode, IC, rectifier	V:	Neon lamp, vacuum tube
C:	Capacitor	L:	Coil, microinductor	R:	Resistor	X:	Crystal OSC
F:	Fuse	M:	Meter, timer	S:	Switch	Z:	Unit
J:	Jack, plug, connector	P:	Lamp	T:	Transformer		

(2) Abbreviation

A:	amperes	Multi:	multiplying
Att, R var:	variable attenuator using film elements	N-ch:	N-channel
		non-lin:	non-linear taper
BL:	boundary layer	Non-pol:	non polarity
Cer:	ceramic	NPN:	negative-positive-negative
CF:	carbon film	Ω:	ohms
Comp:	composition	p:	pico (x 10^{-12})
CRT:	cathode-ray tube	Plast:	plastic film
Di:	diode	PMTR:	potentiometer
DIP:	dual in-line package	PNP:	positive-negative-positive
Elect:	electrolytic aluminum	p-p:	peak-to-peak value
F:	farad	RFC:	RF choke
FET:	field-effect transistor	R-lamp:	resistor lamp
G:	ground	rms:	effective value (root-mean-square)
Ge:	germanium	SBD:	Schottky barrier diode
H:	henry	SCR:	silicon-controlled rectifier
Hz:	hertz	Si:	silicon
IC:	integrated circuit	SRD:	step-recovery diode
IEC:	Conforms to IEC Safety Standards.	Tant:	tantalum
J-FET:	junction FET	TM:	time-lag
k:	kilo (x 10^{3})	Tr:	transistor
LED:	light-emitting diode	Trans:	transformer
M:	mega (x 10^{6})	μ:	micro (x 10^{-6})
m:	milli (x 10^{-3})	V:	volt
MF:	metallized film	Var:	variable
MOS-FET:	metal-oxide semiconductor FET	WW:	wire-wound
M paper:	metallized paper	XTAL:	crystal
M plast:	metallized plastic film		

5.2 Reading Capacitors/Resistors

5.2.1 Capacitor identification



EXAMPLES: 103 = 10,000 pF = 10^{-8} F or 0.01 µF
302 = 3,000 pF = $3x10^{-9}$ F or 0.003 µF
676 = 67,000,000 pF = $67x10^{-6}$ F or 67 µF

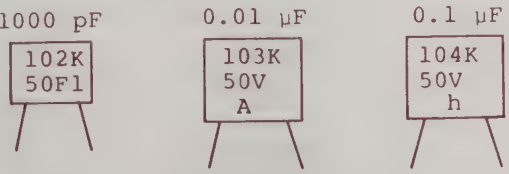
(a) Ceramic and polyester capacitors

Indication	0.5	1	10	101	102	103	104
Capacity	0.5 pF	1 pF	10 pF	100 pF	1000 pF	0.01 µF	0.1 µF

Example:
Ceramic Capacitor

Capacity values are always underlined.

Polyester Capacitor



(b) Tantalum, metallized, and electrolytic capacitors

Indication	OR47	010	100	101
Capacity	0.47 µF	1 µF	10 µF	100 µF

5.2.2 Chip capacitor identification

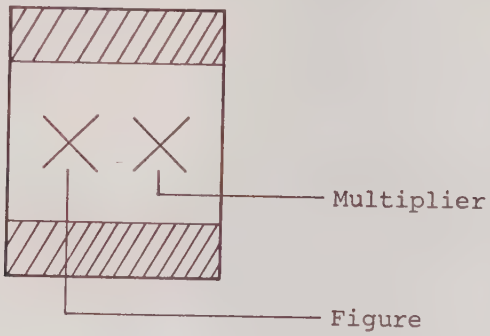
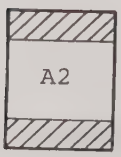
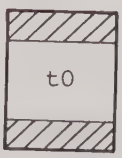


Figure						Multimeter	
Indicated alphabetic character	Corresponding value	Indicated alphabetic character	Corresponding value	Indicated alphabetic character	Corresponding value	Indixated value	Corresponding multiplier
A	1.0	M	3.0	Y	8.2	0	10^0
B	1.1	N	3.3	Z	9.1	1	10^1
C	1.2	P	3.6	a	2.5	2	10^2
D	1.3	Q	3.9	b	3.5	3	10^3
E	1.5	R	4.3	d	4.0	4	10^4
F	1.6	S	4.7	e	4.5	5	10^5
G	1.8	T	5.1	f	5.0	6	10^6
H	2.0	U	5.6	m	6.0	7	10^7
J	2.2	V	6.2	n	7.0	8	10^8
K	2.4	W	6.8	t	8.0	9	10^{-1}
L	2.7	X	7.5	y	9.0		

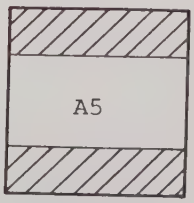
Example:



100 pF

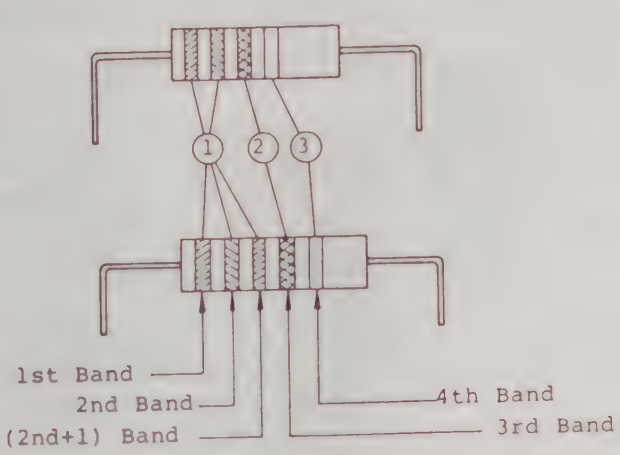


8 pF



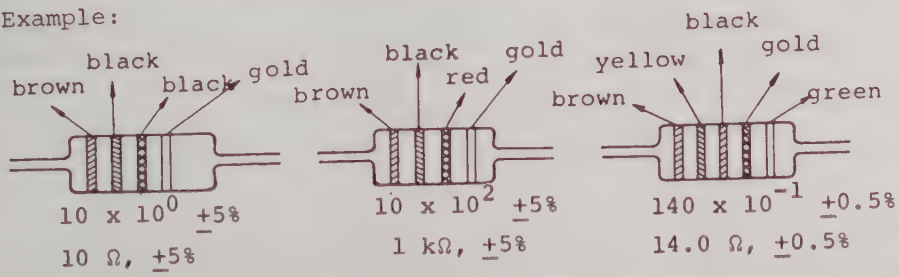
0.1 µF

5.2.3 Resistor identification

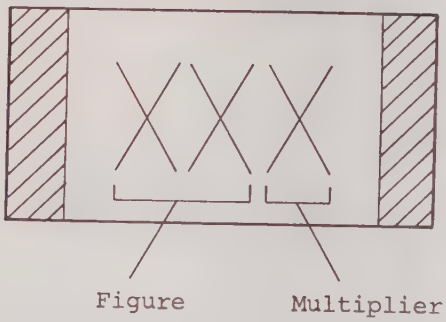


COLOR	① Figure		② Multiplier	③ Tolerance
	1st	2nd	3rd	4th
Black	0	0	$x10^0$	-
Brown	1	1	$x10^1$	-
Red	2	2	$x10^2$	-
Orange	3	3	$x10^3$	-
Yellow	4	4	$x10^4$	-
Green	5	5	$x10^5$	±0.5%
Blue	6	6	$x10^6$	-
Purple	7	7	$x10^7$	-
Gray	8	8	$x10^8$	-
White	9	9	$x10^9$	-
Gold	-	-	$x10^{-1}$	±5%
Silver	-	-	$x10^{-2}$	±10%
-----	-	-		±20%

Example:



5.2.4 Chip resistor identification



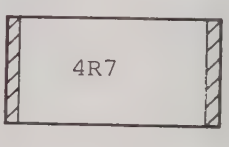
The first two characters are significant digits and the last numeric character indicates the number of zeroes that follow the first two characters.

A decimal point is represented by the character R, and numeric characters are all significant digits in the R representation.

Examples:

100 Ω

10 kΩ



4.7 Ω

5.3 Ordering Information

When ordering parts, please give the following descriptions by referring to the Parts List.

	Item	Example
(1)	Name of Instrument	OPTICAL TIME DOMAIN REFLECTOMETER MW920A
(2)	Name of Parts List	Parts List: A1 CPU
(3)	CKT REF	C3
(4)	Name of Part	CC924F1H104Z Note: Part name is given in parentheses ( ) in the Parts List. Parts with asterisk (*) are those that require factory adjustment after repair. When ordering a part or parts with an asterisk, give a full description of the part.
(5)	Quantity	1
(6)	Serial No. of Instrument	M31257

When ordering PC boards with parts mounted, please include the A-number under item (2) above instead of items (3) and (4). (See Table 3-4 for PC board number.)

5.4 Parts List

Table 5-1 Parts Lift Number

Circuit Diagram No.	Name	A No.	Parts List No.
1	MW920A	—	W4W 8586
2	POWER SUPPLY-1	A1	W4W 11037
3	CPU	A2	W4W 11039
4	ADD	A3	W4W 8592
5	A/D	A4	W4W 8596
6	ENCODER	A5	W4W 8600
7	KEY-1	A6	W4W 8604
8	KEY-2	A7	W4W 8608
9	PRINTER-IF	A8	W4W 11042
10	POWER SUPPLY-3	A9	W4W 10880
11	POWER SUPPLY-2	A10	W4W 10986

Note:

For the PC board number, see Table 3-4.

Parts List: MW920A OTDR

CKT REF	DESCRIPTION	RATING	NOTE
A 1	POWER SUPPLY-1 PC board		W4W11037 W4W11039
A 2	CPU PC board		W4W8592
A 3	ADD PC board		W4W8596
A 4	A/D PC board		W4W8600
A 5	ENCODER PC board		W4W8604
A 6	KEY-1 PC board		W4W8608
A 7	KEY-2 PC board		W4W11042
A 8	PRINTER IF PC board		W4W10880
A 9	POWER SUPPLY-3 PC board		W4W10986
A .	POWER SUPPLY-2 PC board		
F 1	Fuse,(T3.15A 250V)	Time lag type,3.15A, 250V	
F 2	Fuse,(T3.15A 250V)	Time lag type,3.15A, 250V	
F 3	Fuse,(T1.6A 250V)	Time lag type,1.6A, 250V	
F 4	Fuse,(T1.6A 250V)	Time lag type,1.6A, 250V	
G 1	Fan,(MD825M-12)	DC12V	
J 1	Jack,(DDMF-36W4S)	36pins	With DM53743-5000 x 2
J 2	Not assigned		
J 3	Jack,(DF1-2S2.5R24)	2pins	
J 4	Jack,(DF1-2S2.5R24)	2pins	
J 5	Jack,(DF1-15S2.5R24)	15pins	
J 6	Jack,(DF1-2S2.5R24)	2pins	
J 7	Plug,(27DP-LP-196U)		
J 8	Plug,(27DP-LP-196U)		
J 9	Jack,(DF1-5S2.5R24)	5pins	
J 10	Jack,(DF1-5S2.5R24)	5pins	
J 11	Jack,(DF1-10S2.5R24)	10pins	
J 12	Jack,(DF1-10S2.5R24)	10pins	
J 13	Jack,(DF1-8S2.5R24)	8pins	
J 14	Jack,(DF1-5S2.5R24)	5pins	
J 15	Jack,(DF1-2S2.5R24)	2pins	
J 16	Jack,(DF1-8S2.5R24)	8pins	
J 17	Jack,(CR7E-20DB-3.96E)	20pins	
J 18	Plug, (27DP-LP-1.5-1-201)		

( ): Manufacturer's part number
• : Selected at factory

Parts List: MW920A OTDR

CKT REF	DESCRIPTION	RATING	NOTE
	Plug, (27DP-LP-1.5-1-201)		
	Cable, (HIF6-40D-AA-6HA)	40pins	
	Jack,(DF1-3S2.5R24)	3pins	
J 26	Jack,(DF1-8S2.5R24)	8pins	
J 27	Jack,(DF1-2S2.5R24)	2pins	
	Inlet, (8843-2SPFL4.3.6A)		
	Terminal		44E837532
J 27	Jack,(J1-10BNC)		
J 27	Terminal,(260series cage clamp)		
J 28	Jack,(DF1-8S2.5R24)	8pins	
J 29	Jack,(DF1-8S2.5R24)	8pins	
J 30	Jack,(DF1-5S2.5R24)	5pins	
M 1	CF,(ARD25T10SJ1)	[illegible]	
S 1	Slide switch,(ESD3994S)		
S 2	Slide switch,(ESD3994S)		
S 3	Slide switch,(ESD3994S)		
S 4	Push button switch, (ESB99547S)		
T 1	Power transformer, (W4T9748)	[illegible]	
Z 1	Cathode ray tube, (D5MR-52B)		
Z .	Noise filter, (ZMB2203-13)		
Z 3	Thermal printer, (MTP401-G280)		

( ): Manufacturer's part number
• : Selected at factory

Parts List: POWER SUPPLY-1 (A1, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(SXE25VB-3300)	3300μF,±20%,25V	18ø x 30L
C 2	Elect,(SXE25VB-3300)	3300μF,±20%,25V	18ø x 30L
C 3	Elect,(SME10VB-3300)	3300μF,±20%,10V	
C 4	Elect,(SME10VB-4700)	4700μF,±20%,10V	
C 5	Elect,(SME10VB-4700)	4700μF,±20%,10V	
C 6	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 7	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 8	Cer,(CC924CH1H101J)	100pF,±5%,50V	
C 9	Elect, (SME50VNSN2200 22B)	2200μF,±20%,50V	
C 10	Elect, (SME50VNSN2200 22B)	2200μF,±20%,50V	
C 11	Elect,(SXE25VB-3300)	3300μF,±20%,25V	18ø x 30L
C 12	Elect,(SXE25VB-3300)	3300μF,±20%,25V	18ø x 30L
C 13	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 14	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 15	Cer,(CC924CH1H101J)	100pF,±5%,50V	
C 16	Elect, (SME25VNSN4700 22B)	4700μF,±20%,25V	
C 17	Elect, (SME25VNSN4700 22B)	4700μF,±20%,25V	
C 18	Elect,(SME10VB-4700)	4700μF,±20%,10V	
C 19	Elect,(SME10VB-4700)	4700μF,±20%,10V	
C 20	Elect,(SME10VB-4700)	4700μF,±20%,10V	
C 21	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 23	Cer,(CC924CH1H101J)	100pF,±5%,50V	
C 24	Elect,(SXE25VB-3300)	3300μF,±20%,25V	18ø x 30L
C 25	Elect,(SXE25VB-3300)	3300μF,±20%,25V	18ø x 30L
C 26	Elect,(SME10VB-3300)	3300μF,±20%,10V	
C 27	Elect,(SME10VB-4700)	4700μF,±20%,10V	
C 28	Elect,(SME10VB-4700)	4700μF,±20%,10V	
C 29	Not assigned		
C 30	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 31	Not assigned		
C 32	Elect, (SME50VNSN3300-30A)	3300μF,±20%,50V	
C 33	Elect,(SME25VB-1000)	1000μF,±20%,25V	
C 34	Elect,(SME25VB-1000)	1000μF,±20%,25V	
C 35	Elect,(SME25VB-1000)	1000μF,±20%,25V	
C 36	Elect,(SME25VB-1000)	1000μF,±20%,25V	
C 37	Elect,(SRA16VB-10)	10μF,±20%,16V	
C 38	Elect,(SRA10VB-22)	22μF,±20%,10V	
C 39	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 40	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 41	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 42	Cer,(CC924CH1H102J)	1000pF,±5%,50V	

( ): Manufacturer's part number
• : Selected at factory

Parts List: POWER SUPPLY-1 (A1, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
C 43	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 44	Cer,(CC924CH1H101J)	100pF,±5%,50V	
C 45	Elect, (SME50VNSN2200 22B)	2200μF,±20%,50V	
C 46	Elect, (SME50VNSN2200 22B)	2200μF,±20%,50V	
C 47	Elect,(SME25VB-1000)	1000μF,±20%,25V	
C 48	Elect,(SME25VB-1000)	1000μF,±20%,25V	
C 49	Elect,(SME25VB-1000)	1000μF,±20%,25V	
C 50	Elect,(SME25VB-1000)	1000μF,±20%,25V	
C 51	Elect,(SRA16VB-10)	10μF,±20%,16V	
C 52	Elect,(SRA10VB-22)	22μF,±20%,10V	
C 53	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 54	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 55	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 56	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 57	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 58	Cer,(CC924CH1H101J)	100pF,±5%,50V	
C 59	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C 60	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C 61	Elect, (SME35VNSN6800 30B)	6800μF,±20%,35V	
C 62	Elect, (SME35VNSN6800 30B)	6800μF,±20%,35V	
C 63	Elect,(SXE35VB-2200)	2200μF,±20%,35V	18ø x 30L
C 64	Elect,(SXE35VB-2200)	2200μF,±20%,35V	18ø x 30L
C 65	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 66	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 67	Cer,(CC924CH1H101J)	100pF,±5%,50V	
C 68 to C 78	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 79	Cer,(RPE113F105250)	1μF,+80/-20%,50V	
C 80	Cer,(DSS310-55D223S)	0.022μF,+50/-20%,50V	
C 81	Elect,(CE04C1E102A)	1000μF,±20%,25V	
C 82	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C 83	Elect,(SR25VB-100)	100μF,±20%,25V	
C 84	Elect,(CE04C1E331A)	330μF,±20%,25V	
C 85	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 86	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 87	Cer,(CK924C1H472M)	4700pF,±20%,50V	
C 88	Cer,(CK924C1H472M)	4700pF,±20%,50V	
C 89	Cer,(CK924C1H472M)	4700pF,±20%,50V	
C 90	Cer,(CK924C1H472M)	4700pF,±20%,50V	
C 91	Cer,(CK924C1H472M)	4700pF,±20%,50V	
C 92	Not assigned		
C 93	Cer,(CK924C1H103M)	0.01μF,±20%,50V	

( ): Manufacturer's part number
• : Selected at factory

Parts List: POWER SUPPLY-1 (A1, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
C 94	Not assigned		
F 1	Fuse,(T1A 250V)	Time lag type,1A, 250V	
F 2	Fuse,(T1A 250V)	Time lag type,1A, 250V	
F 3	Fuse,(T2A 250V)	Time lag type,2A, 250V	
F 4	Not assigned		
F 5	Fuse,(T800MA 250V)	Time lag type,800mA, 250V	
F 6	Fuse,(T1A 250V)	Time lag type,1A, 250V	
F 7	Fuse,(T3.15A 250V)	Time lag type,3.15A, 250V	
J 1	Plug,(DF1-8P2.5DSA)	8pins	
J 2	Plug,(DF1-8P2.5DSA)	8pins	
J 3	Plug,(DF1-8P2.5DSA)	8pins	
J 4	Not assigned		
J 5	Plug,(DF1-2P2.5DSA)	2pins	
J 6	Plug,(DF1-2P2.5DSA)	2pins	
J 7	Plug,(DF1B-5P2.5DSA(01))	5pins	
J 8	Jack, (PCN10C-20S2.54DSA)	20pins	
J 9	Jack, (PCN10C-20S2.54DSA)	20pins	
J 10	Plug,(DF1-10P2.5DSA)	10pins	
J 11	Jack, (PCN10C-20S2.54DSA)	20pins	
L 1	Coil,(SKU-053)	0.55mH	With stopper
L 2	Coil,(SKU-054)	1.3mH	With stopper
L 3	Coil,(SKU-052)	0.45mH	With stopper
L 4	Not assigned		
L 5	Coil,(SKU-054)	1.3mH	With stopper
L 6	Coil,(SKU-054)	1.3mH	With stopper
L 7	Coil,(SKU-054)	1.3mH	With stopper

( ): Manufacturer's part number
* : Selected at factory

Parts List: POWER SUPPLY-1 (A1, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
L 8	Coil,(LH1-471K)	470μH,±10%	
Q 1	Rectifier,(RB402LFD)		
Q 2	Rectifier,(S5S4)		
Q 3	Rectifier,(RB402LFD)		
Q 4	Rectifier,(GU-3SY)		
Q 5	Rectifier,(S10VB10)		
Q 6	Rectifier,(S5S4)		
Q 7	Rectifier,(S5S4)		
Q 8	Rectifier,(S5S4)		
Q 9	Rectifier,(RB152LFB)		
Q 10	IC,(μPC494C)		
Q 11	Rectifier,(GU-3SY)		
Q 12	Di,breakdown,(RD6.2E)	5.78 to 6.44V,400mW	
Q 13	Di,breakdown,(1SZ52)	5.9 to 6.5V,250mW	
Q 14	IC,(μPC151C)		
Q 15	Rectifier,(RB402LFD)		
Q 16	IC,(μPC494C)		
Q 17	Rectifier,(GU-3SY)		
Q 18	Di,breakdown,(RD6.2E)	5.78 to 6.44V,400mW	
Q 19	Di,breakdown,(1SZ52)	5.9 to 6.5V,250mW	
Q 20	IC,(μPC151C)		
Q 21	Rectifier,(RB402LFD)		
Q 22	Rectifier,(GU-3SY)		
Q 23	Rectifier,(GU-3SY)		
Q 24	IC,(MAX636BEPA)		
Q 25	Di,(1S954)		
Q 26	Di,(1S954)		
Q 27	Di,(1S954)		
R 1	MF,(RS1FB1.5KΩ J)	1.5kΩ,±5%,1W	
R 2	MF,(RN14K2E2492D)	24.9kΩ,±0.5%,1/4W	
R 3	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R 4	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 5	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 6	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R 7	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 8	CF,(ARD25T203J)	20kΩ,±5%,1/4W	
R 9	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 10	Var,MF,(RJ-6P 5KΩ)	5.0kΩ,1/2W	
R 11	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R 12	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 13	CF,(ARD25T562J)	5.6kΩ,±5%,1/4W	
R 14	CF,(ARD25T562J)	5.6kΩ,±5%,1/4W	
R 15	Var,MF,(RJ-6P 1KΩ)	1.0kΩ,1/2W	

( ): Manufacturer's part number
* : Selected at factory

Parts List: POWER SUPPLY-1 (A1, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
R 16	MF,(RS1FB1KΩ J)	1.0kΩ,±5%,1W	
R 17	MF,(RN14K2E2492D)	24.9kΩ,±0.5%,1/4W	
R 18	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R 19	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 20	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 21	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R 22	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 23	CF,(ARD25T203J)	20kΩ,±5%,1/4W	
R 24	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 25	Var,MF,(RJ-6P 5KΩ)	5.0kΩ,1/2W	
R 26	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R 27	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 28	CF,(ARD25T562J)	5.6kΩ,±5%,1/4W	
R 29	CF,(ARD25T562J)	5.6kΩ,±5%,1/4W	
R 30	Var,MF,(RJ-6P 1KΩ)	1.0kΩ,1/2W	
R 31	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R 32	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R 33	CF,(ARD25T510J)	51Ω,±5%,1/4W	
R 34	CF,(ARD25T510J)	51Ω,±5%,1/4W	
R 35	CF,(ARD25T510J)	51Ω,±5%,1/4W	
R 36	CF,(ARD25T510J)	51Ω,±5%,1/4W	
R 37	CF,(ARD25T510J)	51Ω,±5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

Parts List: CPU(A2, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
B 1	Buzzer,(PKB-8-4A0)	DC5V	
C 1	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 2	Elect,(SR10VB-33)	33μF,±20%,10V	
C 3	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 4	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 5	Cer,(CC45CH1H330JY)	33pF,±5%,50V	
C 6	Cer,(T203R300A)	30pF,100V	
C 7	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 8	Elect,(SR25VB-33)	33μF,±20%,25V	
C 9	Elect,(SR25VB-100)	100μF,±20%,25V	
C 10	Elect,(CE04C1C471A)	470μF,±20%,16V	
C 11	Elect,(SR25VB-47)	47μF,±20%,25V	
C 12	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 13	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 14	Elect,(SR10VB-330)	330μF,±20%,10V	
C 15	Elect,(SR10VB-330)	330μF,±20%,10V	
C 16	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 17	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 18	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 19	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 20	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 21	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 22	Not assigned		
C 23 to C 62	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 63	Not assigned		
C 64	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 65	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 66	Not assigned		
C 67	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 68	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 69	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 70	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 71	Elect,(SR10VB-100)	100μF,±20%,10V	
C 72	Elect,(SR10VB-100)	100μF,±20%,10V	
C 73	Elect,(SR10VB-220)	220μF,±20%,10V	
C 74	Elect,(SR10VB-220)	220μF,±20%,10V	
C 75	Elect,(SR10VB-100)	100μF,±20%,10V	
C 76	Elect,(SR10VB-100)	100μF,±20%,10V	
C 77	Elect,(SR10VB-100)	100μF,±20%,10V	
C 78	Elect,(SR10VB-100)	100μF,±20%,10V	
C 79	Elect,(SR10VB-100)	100μF,±20%,10V	
C 80	Cer,(CC924CH1H471J)	470pF,±5%,50V	
C 81	Cer,(CC924CH1H102J)	1000pF,±5%,50V	

( ): Manufacturer's part number
* : Selected at factory

Parts List: CPU(A2, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
J 1	Plug, (DF1B-5P-2.5DSA(01))	5pins	
J 2	Jack, (HIF3H-50DA-2.54DSA)	50pins	
J 3	Plug, (DF1B-8P-2.5DSA(01))	8pins	
J 4	Plug,(DF1-2P2.5DSA)	2pins	
J 5	Plug, (HIF3F-20PA-2.54DS)	20pins	
J 6	Plug, (HIF3F-20PA-2.54DS)	20pins	
J 7	Plug,(DF1-15P2.5DSA)	15pins	
J 8	Not assigned		
J 9	Plug,(FFC-2AMEP)	2pins	
J 10	Jack,(27DP-LR-PC)		
J 11	Socket,(DIC-130)	2pins	
L 1	Coil,(SF-T8-50D)	125uH	
L 2	Not assigned		
M 1	Timer,(TM-0)	5000H	
Q 1	IC,(HD68HC000P-8)		With socket
Q 2	IC,(MNC30SDP)		
Q 3	IC,(TL7705CP)		
Q 4	IC,(74HC03)		
Q 5	IC,(74HC05)		
Q 6	IC,(74HC11)		
Q 7	IC,(EP ROM32KX8-25C)		With socket
Q 8	IC,(EP ROM32KX8-25C)		With socket
Q 9	IC,(μPD43256C-12L)		
Q 10	IC,(μPD43256C-12L)		
Q 11	Not assigned		
Q 12	Not assigned		
Q 13	IC,(74HC32)		
Q 14	Di,(1S953)		
Q 15	Tr,(2SC945)		
Q 16	Di,(1S953)		
Q 17	Not assigned		
Q 18	IC,(S-8054ALB)		

( ): Manufacturer's part number
• : Selected at factory

Parts List: CPU(A2, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
Q 19	IC,(RP5C15)		
Q 20	IC,(74HC00)		
Q 21	IC,(HD63484P-8)		
Q 22	IC,(74HC573)		
Q 23	IC,(74HC573)		
Q 24	IC,(74HC245)		
Q 25	IC,(74HC245)		
Q 26	IC,(74HC245)		
Q 27	IC,(74HC245)		
Q 28	IC,(74HC4075)		
Q 29	IC,(74HC20)		
Q 30	IC,(74HC04)		
Q 31	IC,(74HC00)		
Q 32	IC,(74HC164)		
Q 33	IC,(74HC74)		
Q 34	IC,(HM6264ALSP-12)		
Q 35	IC,(HM6264ALSP-12)		
Q 36	IC,(HM6264ALSP-12)		
Q 37	IC,(HM6264ALSP-12)		
Q 38	IC,(HM6264ALSP-12)		
Q 39	IC,(HM6264ALSP-12)		
Q 40	IC,(HM6264ALSP-12)		
Q 41	IC,(HM6264ALSP-12)		
Q 42	IC,(74HC166)		
Q 43	IC,(74HC166)		
Q 44	IC,(74HC166)		
Q 45	IC,(74HC166)		
Q 46	IC,(74HC244)		
Q 47	IC,(74HC244)		
Q 48	IC,(74HC245)		
Q 49	IC,(74HC245)		
Q 50	IC,(74HC245)		
Q 51	IC,(74HC245)		
Q 52	IC,(74HC13B)		
Q 53	IC,(74HC139)		
Q 54	IC,(74HC4075)		
Q 55	IC,(74LS266)		
Q 56	IC,(7407)		
Q 57	IC,(7407)		
Q 58	Di,(1S953)		
Q 59	Tr,(2SC945)		
Q 60	Tr,(2SC945)		
Q 61	IC,(74HC74)		
Q 62	Tr,(2SC945)		

( ): Manufacturer's part number
• : Selected at factory

Parts List: CPU(A2, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
R 1	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 2	CF,(ARD25T103J)	10kΩ,,±5%,1/4W	
R 3	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 4	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 5	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 6	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 7	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 8	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 9	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 10	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 11	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 12	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 13	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 14	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 15	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 16	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 17	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 18	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 19	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 20	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 21	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 22	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 23	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 24	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 25	SIL type,(RRS-4-472JA)	4.7kΩ x 4,±5%,1/8W	
R 26	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R 27	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R 28	CF,(ARD25T470J)	47Ω,±5%,1/4W	
R 29	CF,(ARD25T470J)	47Ω,±5%,1/4W	
R 30	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 31	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 32	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 33	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W	
R 34	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R 35	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 36	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R 37	CF,(ARD25T470J)	47Ω,±5%,1/4W	
R 38	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W	
R 39	CF,(ARD25T562J)	5.6kΩ,±5%,1/4W	
R 40	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W	
R 41	CF,(ARD25T822J)	8.2kΩ,±5%,1/4W	
R 42	CF,(ARD25T562J)	5.6kΩ,±5%,1/4W	
R 43	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 44	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 45	CF,(ARD25T100J)	10Ω,±5%,1/4W	

( ): Manufacturer's part number
• : Selected at factory

Parts List: CPU(A2, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
R 46	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 47	CF,(ARD25T100J)	10Ω,±5%,1/4W	
R 48	SIL type,(RRS-4-103JA)	10kΩ x 4,±5%,1/8W	
R 49	Not assigned		
R 50	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 51	CF,(ARD25T301J)	300Ω,±5%,1/4W	
R 52	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 53	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W	
R 54	CF,(ARD25T105J)	1.0MΩ,±5%,1/4W	
R 55	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 56	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 57	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 58	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 59	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 60	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W	
R 61	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R 62	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 63	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 64	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
X 1	Crystal oscillator, (SG-31(8MHZ))	8MHz	
X 2	Crystal oscillator, (TCO-711S(11MHZ))	11MHz	
X 3	Crystal vibrator, (MX38(32.768KHZ))	32.768kHz	
Z 1	Battery,(BR-AT2SP)		

( ): Manufacturer's part number
• : Selected at factory

Parts List: ADD(A3, MW920A) 4

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(SR10VB-22)	22uF,±20%,10V	
C 2	Cer,(DSS310-55D223S)	0.022uF,+50/-20%,50V	
C 3	Cer,(DSS310-55D223S)	0.022uF,+50/-20%,50V	
C 4	Elect,(SR10VB-220)	220uF,±20%,10V	
C 5	Elect,(SR10VB-220)	220uF,±20%,10V	
C 6	Cer,(CK737F1H105Z)	1uF,+80/-20%,50V	
C 7	Cer,(CK737F1H105Z)	1uF,+80/-20%,50V	
C 8 to C 34	Cer,(CK733F1H104Z)	0.1uF,+80/-20%,50V	
C 35	Elect,(SR10VB-100)	100uF,±20%,10V	
C 36	Elect,(SR10VB-100)	100uF,±20%,10V	
C 37	Elect,(SR10VB-100)	100uF,±20%,10V	
C 38	Elect,(SR10VB-100)	100uF,±20%,10V	
C 39	Elect,(SR10VB-100)	100uF,±20%,10V	
J 1	Plug, (HIF3H-50PA-2.54DSA)	50pins	
J 2	Plug,(HIF6-40PA-1.27DS)	40pins	
J 3	Jack,(27DP-R-PC-1)		
J 4	Jack,(57LE-GP-IB)	24pins	
Q 1	IC,(MNC3034FP)		
Q 2	IC,(MNC3033FP)		
Q 3	IC,(MNC3031FP)		
Q 4	IC,(MNC3032FP)		
Q 5	IC,(HM6116ALSP-12)		
Q 6	IC,(HM6116ALSP-12)		
Q 7	IC,(HM6116ALSP-12)		
Q 8	IC,(HM6116ALSP-12)		
Q 9	IC,(HM6116ALSP-12)		
Q 10	IC,(HM6116ALSP-12)		
Q 11	IC,(HM6116ALSP-12)		
Q 12	IC,(HM6116ALSP-12)		
Q 13	IC,(74HC7266)		
Q 14	IC,(74HC08F)		
Q 15	IC,(74HC74F)		
Q 16	IC,(74HC02F)		
Q 17	IC,(74HC244F)		
Q 18	IC,(74HC273F)		
Q 19	IC,(74HC273F)		
Q 20	IC,(74HC138F)		
Q 21	IC,(74HC74F)		
Q 22	IC,(74HC240F)		
Q 23	IC,(TMS9914ANL)		

( ): Manufacturer's part number
• : Selected at factory

Parts List: ADD(A3, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
Q 24	IC,(SN75161BN)		
Q 25	IC,(SN75160BN)		
R 1 to R 14	SIL type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W	
R 15	CF,(ARD25T103JJ)	10kΩ,±5%,1/4W	
R 16	CF,(ARD25T472JJ)	4.7kΩ,±5%,1/4W	
R 17	CF,(ARD25T103JJ)	10kΩ,±5%,1/4W	
R 18	CF,(ARD25T472JJ)	4.7kΩ,±5%,1/4W	
R 19	CF,(ARD25T103JJ)	10kΩ,±5%,1/4W	
S 1	Switch,(BP-6)		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A/D (A4, MW920A) 5

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(SR25VB-33)	33uF,±20%,25V	
C 2	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 3	Cer,(CK924C1H102M)	1000pF,±20%,50V	
C 4	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 5	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 6	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 7	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 8	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 9	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 10	Elect,(SR25VB-33)	33uF,±20%,25V	
C 11	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 12	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 13	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 14	Elect,(SR10VB-220)	220uF,±20%,10V	
C 15	Elect,(SR10VB-220)	220uF,±20%,10V	
C 16	Cer,(DSS310-55D223S)	0.022uF,+50/-20%,50V	
C 17	Cer,(DSS310-55D223S)	0.022uF,+50/-20%,50V	
C 18	Elect,(SR25VB-100)	100uF,±20%,25V	
C 19	Elect,(SR25VB-100)	100uF,±20%,25V	
C 20	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 21	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 22	Cer,(DSS310-55D223S)	0.022uF,+50/-20%,50V	
C 23	Elect,(SR25VB-100)	100uF,±20%,25V	
C 24	Cer,(RPE113F105Z50)	1uF,+80/-20%,50V	
C 25	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 26	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 27	Elect,(SR10VB-220)	220uF,±20%,10V	
C 28	Elect,(SR10VB-220)	220uF,±20%,10V	
C 29	Elect,(SR10VB-220)	220uF,±20%,10V	
C 30	Elect,(SR10VB-220)	220uF,±20%,10V	
C 31	Elect,(SR10VB-330)	330uF,±20%,10V	
C 32	Elect,(SR10VB-330)	330uF,±20%,10V	
C 33	Cer,(RPE113F105Z50)	1uF,+80/-20%,50V	
C 34	Cer,(RPE113F105Z50)	1uF,+80/-20%,50V	
C 35	Cer,(RPE113F105Z50)	1uF,+80/-20%,50V	
C 36	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 37	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 38	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 39	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 40	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 41	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 42	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 43	Elect,(SR10VB-220)	220uF,±20%,10V	
C 44	Cer,(RPE113F105Z50)	1uF,+80/-20%,50V	
C 45 to C 95	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	

( ): Manufacturer's part number
• : Selected at factory

Parts List: A/D (A4, MW920A)

CKT REF	DESCRIPTION	RATING	NOTE
C 96	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 97	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 98	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 99	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C100	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C101	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C102	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C103	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C104	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C105	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C106	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C107	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C108	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C109	Cer,(CC924CH1H221J)	220pF,±5%,50V	
F 1	Fuse, (MF51NN250V0.1ADC01)	DC250V,0.1A	
F 2	Fuse,(MF51NN250V0.315A DC01)	DC250V,0.315A	
F 3	Fuse,(MF51NN250V0.315A DC01)	DC250V,0.315A	
J 1	Plug,(DF1-5P2.5DSA)	5pins	
J 2	Jack,(27DP-R-PC-1)		
J 3	Not assigned		
J 4	Jack,(27DP-R-PC-1)		
J 5	Jack,(24DP-R-PC-1)		
J 6	Plug,(DF1-10P2.5DSA)	10pins	
J 7	Plug,(HIF6-40PA-1.27DS)	40pins	
J 8	Plug,(DF1-2P2.5DSA)	2pins	
J 9	Plug,(FFC-2AMEP)	2pins	
J 10	Plug,(FFC-2AMEP)	2pins	
J 11	Plug,(FFC-2AMEP)	2pins	
J 12	Plug,(FFC-2AMEP)	2pins	
J 13	Plug,(FFC-2AMEP)	2pins	
J 14	Plug,(FFC-2AMEP)	2pins	
J 15	Plug,(DIC-130)		
J 16	Plug,(DIC-130)		
J 17	Plug,(DIC-130)		
J 18	Plug,(DIC-130)		
J 19	Plug,(DIC-130)		
J 20	Plug,(DIC-130)		
L 1	Delay line, (DE6B-500T09-DJ)		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A/D (A4, MW920A)

CKT REF	DESCRIPTION	RATING		NOTE
L 2	Delay line, (DE6B-500T09-D3)			
L 3	Delay line, (DE6B-500T09-D3)			
L 4	Delay line, (DE6B-500T09-D3)			
L 5	Delay line, (DE6B-500T09-D3)			
L 6	Delay line, (DE6B-500T09-D3)			
L 7	Delay line, (DE6B-500T09-D3)			
L 8	Delay line, (DE6B-500T09-D3)			
L 9	Delay line, (DE6B-500T09-D3)			
L 10	Delay line, (DE6B-500T15-D3)			
L 11	Delay line, (DE6B-500T15-D3)			
L 12	Coil,(SP0408-1R0K)	1μH		
L 13	Coil,(LF8-100K)	10μH		
L 14	Coil,(LF8-100K)	10μH		
L 15	Coil,(SF-T8-50D)	125μH		
L 16	Coil,(SF-T8-50D)	125μH		
L 17	Coil,(SF-T8-50D)	125μH		
Q 1	Di,breakdown,(RD9.1E)	8.29 to 9.30V,400mW		
Q 2	IC,(MC10H116L)			
Q 3	Di,(1S953)			
Q 4	IC,(MC10H136L)			
Q 5	IC,(HD100102F)			
Q 6	IC,(HD100164F)			
Q 7	IC,(HD10124)			
Q 8	IC,(HD10124)			
Q 9	IC,(HD10124)			
Q 10	IC,(MC10H176L)			
Q 11	IC,(MC10H131L)			
Q 12	IC,(MC10H131L)			
Q 13	IC,(MC10H102L)			
Q 14	IC,(MC10H102L)			
Q 15	IC,(HD100102F)			
Q 16	IC,(SDA5200S)			
Q 17	IC,(HD100151F)			
Q 18	IC,(μPB100474BH-8)			
Q 19	IC,(μPB100474BH-8)			

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A/D (A4, MW920A)

CKT REF	DESCRIPTION	RATING		NOTE
Q 20	IC,(HD100151F)			
Q 21	IC,(HD100151F)			
Q 22	IC,(HD100136F)			
Q 23	IC,(HD100136F)			
Q 24	IC,(HD100136F)			
Q 25	Di,(1S953)			
Q 26	IC,(HD10125)			
Q 27	IC,(HD10125)			
Q 28	IC,(HD10124)			
Q 29	IC,(MC10H176L)			
Q 30	IC,(HD10164)			
Q 31	IC,(HD10125)			
Q 32	Di,breakdown,(RD5.1E)	4.8 to 5.37V,400mW		
Q 33	Tr,(2SA1151)			
Q 34	Di,breakdown,(1SZ52)	5.9 to 6.5V,250mW		
Q 35	IC,(μPC1251C)			
Q 36	Tr,(2SD794A)			
Q 37	Tr,(2SB744A)			
Q 38	Tr,(2SA1443(M))			
Q 39	IC,(μPC1251C)			
Q 40	Di,breakdown,(RD3.6E)	3.4 to 3.845V,400mW		
Q 41	LED,(TLR226)			
Q 42	Di,(1SS99)			
Q 43	Di,(1SS99)			
Q 44	IC,(TC74HC590)			
Q 45	IC,(74HC30)			
Q 46	IC,(74LS74A)			
R 1	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R 2	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 3	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 4	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 5	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 6	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 7	MF,(RN14K2E51R1D)	51.1Ω,±0.5%,1/4W		
R 8	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 9	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 10	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 11	CF,(ARD25T510J)	51Ω,±5%,1/4W		
R 12	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 13	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R 14	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R 15	MF,(RN14K2E1152D)	11.5kΩ,±0.5%,1/4W		
R 16	Var,MF,(RJ-6P 2KΩ)	2.0kΩ,1/2W		
R 17	MF,(RN14K2E5621D)	5.62kΩ,±0.5%,1/4W		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A/D (A4, MW920A)

CKT REF	DESCRIPTION	RATING		NOTE
R 18	MF,(RN14K2E4991D)	4.99kΩ,±0.5%,1/4W		
R 19	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 20	MF,(RN14K2E4021D)	4.02kΩ,±0.5%,1/4W		
R 21	MF,(RN14K2E6041D)	6.04kΩ,±0.5%,1/4W		
R 22	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 23	MF,(RN14K2E2431D)	2.43kΩ,±0.5%,1/4W		
R 24	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 25	Not assigned			
R 26	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 27	Var,MF,(RJ-6P 5KΩ)	5.0kΩ,1/2W		
R 28	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R 29	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 30	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 31	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 32	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 33	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 34	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 35	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 36	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 37	SIL type,(RRS-8-102JA)	1kΩ x 8,±5%,1/8W		
R 38	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 39	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 40	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 41	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 42	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 43	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 44	SIL type,(RRS-8-221JA)	220Ω x 8,±5%,1/8W		
R 45	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 46	CF,(ARD25T510J)	51Ω,±5%,1/4W		
R 47	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R 48	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 49	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 50	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 51	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 52	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 53	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 54	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 55	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 56	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 57	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 58	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 59	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 60	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
X 1	Crystal oscillator, (NSA0061A)	99.93082MHz		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: ENCODER (A5, MW920A) 6

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(SR10VB-100)	100μF,±20%,10V		
C 2	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 3	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 4	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 5	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
J 1	Cable, (CNF23-20D-AA-20S)	20pins		
J 2	Cable,(FSN-21A-10)	10pins		
J 3	Cable,(FSN-21A-10)	10pins		
J 4	Plug,(DF1-3P2.5DSA)	3pins		
Q 1	Tr,photo,(PT350B)			
Q 2	Tr,photo,(PT350B)			
Q 3	IC,(74HC14)			
Q 4	IC,(74HC74)			
Q 5	IC,(74H125)			
Q 6	IC,(74HC74)			
R 1	CF,(ARD25T510J)	51Ω,±5%,1/4W		
R 2	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 3	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 4	SIL type,(RRS-6-104JA)	100kΩ x 6,±5%,1/8W		
R 5	Var,MF,(RJ-6S 100Ω)	10kΩ,1/2W		
Z 1	Encoder,(MRE20)			

( ): Manufacturer's part number
• : Selected at factory

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Parts List: KEY-1(A6, MW920A) 7

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Cer,(CK737F1H105Z)	1μF,+80/-20%,50V		
C 2	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 3	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 4	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 5	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 6	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 7	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 8	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C 9	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
J 1	Not assigned			
J 2	Not assigned			
Q 1	IC,(MM74C923N)			
Q 2	IC,(74HC174)			
Q 3	IC,(74HC174)			
Q 4	LED,(LN442YP)			
Q 5	Not assigned			
Q 6	Not assigned			
Q 7	Not assigned			
Q 8	Not assigned			
Q 9	Not assigned			
Q 10	LED,(LN342GP)			
Q 11	LED,(LN342GP)			
Q 12	LED,(LN342GP)			
Q 13	LED,(LN342GP)			
Q 14	LED,(LN342GP)			
Q 15	LED,(LN342GP)			
Q 16	LED,(LN342GP)			
R 1	SIL type,(RRS-8-331JA)	330Ω x 8,±5%,1/8W		
R 2	SIL type,(RRS-8-331JA)	330Ω x 8,±5%,1/8W		
R 3	CF,(ARD[illegible]T471J)	470Ω,±5%,1/4W		
S 1	Key board switch, (HL20-LSYG)			
S 2	Key board switch, (HL20-LSOR)			
S 3	Key board switch, (KEG10901)			
S 4	Key board switch, (KEG10901)			
S 5	Key board switch, (KEG10901)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: KEY-1(A6, MW920A)

CKT REF	DESCRIPTION	RATING		NOTE
S 6	Key board switch, (HL20-LSYG)			
S 7	Key board switch, (HL20-LSYG)			
S 8	Key board switch, (HL20-LSYG)			
S 9	Key board switch, (HL20-NS)			
S 10	Key board switch, (HL20-NS)			
S 11	Key board switch, (HL20-NS)			
S 12	Key board switch, (KEG10901)			
S 13	Key board switch, (KEG10901)			
S 14	Key board switch, (KEG10901)			
S 15	Key board switch, (HL20-NS)			
S 16	Key board switch, (HL20-NS)			
S 17	Key board switch, (HL20-NS)			
S 18	Key board switch, (KEG10901)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: KEY-2(A7, MW920A) 8

CKT REF	DESCRIPTION	RATING		NOTE
J 1	Plug,(DF1-8P2.5DS)	8pins		
R 1	Var,MF, (RG161N15SB50KΩ M)	50kΩ,1/2W		
R 2	CF,(ARD25T513J)	51kΩ,±5%,1/4W		
S 1	Key board switch, (HL20-NS)			
S 2	Key board switch, (HL20-NS)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: PRINTER IF (A8, MW920A) 9

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Plast,(ECQ-M1H223KZ)	22000μF,±10%,50V		
C 2	Plast,(ECQ-M1H472KZ)	4700pF,±10%,50V		
C 3	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 4	Cer,(CC924CH1H561J)	560pF,±5%,50V		
C 5	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C 6	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 7	Elect,(SR10VB-2200)	2200μF,±20%,10V		
C 8	Elect,(SR10VB-220)	220μF,±20%,10V		
C 9	Elect,(SR10VB-100)	100μF,±20%,10V		
C 10	Elect,(SR10VB-100)	100μF,±20%,10V		
C 11 to C 24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
J 1	Cable, (CNF23-20D-AA-20S)	20pins		
J 2	Jack,(HBLB9S-1J)	9pins		
J 3	Plug,(DF1-5P2.5DSA)	5pins		
L 1	Coil,(SF-T8-50D)	125μH		
L 2	Coil,(SP0408-6R8K)	6.8μH		
Q 1	IC,(74HC273F)			
Q 2	IC,(74HC273F)			
Q 3	IC,(74HC273F)			
Q 4	IC,(74HC32F)			
Q 5	IC,(74HC32F)			
Q 6	IC,(74HC00F)			
Q 7	IC,(74HC00F)			
Q 8	IC,(74HC08F)			
Q 9	IC,(74HC08F)			
Q 10	IC,(LB1257)			
Q 11	IC,(74HC74F)			
Q 12	IC,(TC74HC423AP)			
Q 13	IC,(74HC125F)			
Q 14	IC,(74HC14F)			
Q 15	Tr,(2SC945)			
Q 16	Tr,(2SC945)			
Q 17	Tr,(2SC97A)			
Q 18	Tr,(2SC97A)			
Q 19	Di,(1S953)			
Q 20	Di,(1S953)			
Q 21	Tr,(2SC945)			

( ): Manufacturer's part number
• : Selected at factory

M-1

Parts List: PRINTER IF (A8, MW920A)

CKT REF	DESCRIPTION	RATING		NOTE
R 1	Var,MF,(RJ-6S 50KΩ)	50kΩ,1/2W		
R 2	CF,(ARD25T683J)	68kΩ,±5%,1/4W		
R 3	Var,MF,(RJ-6S 20KΩ)	20kΩ,1/2W		
R 4	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R 5	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 6	CF,(ARD25TJ33J)	33kΩ,±5%,1/4W		
R 7	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 8	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 9	CF,(ARD25T301J)	300Ω,±5%,1/4W		
R 10	CF,(ARD25T224J)	220kΩ,±5%,1/4W		
R 11	CF,(ARD25T224J)	220kΩ,±5%,1/4W		
R 12	CF,(ARD25T683J)	68kΩ,±5%,1/4W		
R 13	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R 14	SIL type,(RRS-8-104JA)	100kΩ x 8,±5%,1/8W		
R 15	SIL type,(RRS-6-104JA)	100kΩ x 8,±5%,1/8W		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: POWER SUPPLY-1 (A9, MW920A) 10

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(CE04C1E102A)	1000μF,±20%,25V		
C 2	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
J 1	Plug,(PCN10-20P2.54DSA)	20pins		
J 2	Plug,(PCN10-20P2.54DSA)	20pins		
J 3	Plug,(DF1-2P2.5DSA)	2pins		
L 1	Coil,(LM1-103K)			
Q 1	Tr,(2SA1441)			
Q 2	Tr,(2SA1441)			
Q 3	Tr,(2SA1443)			
Q 4	Tr,(2SA1441)			
Q 5	Tr,(2SA1441)			
Q 6	Tr,(2SA1441)			
Q 7	Tr,(2SD1593)			
Q 8	Tr,(2SD1593)			
Q 9	Tr,(2SA1396)			

( ): Manufacturer's part number
• : Selected at factory

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Parts List: POWER SUPPLY-2 (A10, MW920A) 11

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(SRA16VB-10)	10μF,±20%,16V		
C 2	Elect,(SRA10VB-22)	22μF,±20%,10V		
C 3	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C 4	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C 5	Elect,(SRA16VB-10)	10μF,±20%,16V		
C 6	Elect,(SRA10VB-22)	22μF,±20%,10V		
C 7	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C 8	Not assigned			
C 9	Elect,(SRA16VB-10)	10μF,±20%,16V		
C 10	Elect,(SRA10VB-22)	22μF,±20%,10V		
C 11	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C 12	Not assigned			
C 13	Not assigned			
C 14	Not assigned			
C 15	Not assigned			
C 16	Not assigned			
C 17	Elect,(SRA16VB-10)	10μF,±20%,16V		
C 18	Elect,(SRA10VB-22)	22μF,±20%,10V		
C 19	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C 20	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C 21	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
J 1	Plug,(PCN10-20P2.54DSA)	20pins		
Q 1	IC,(μPC494C)			
Q 2	IC,(μPC494C)			
Q 3	IC,(μPC494C)			
Q 4	Not assigned			
Q 5	IC,(μPC494C)			
Q 6	IC,(μPC1251C)			
Q 7	Di,breakdown,(RD3.6E)	3.4 to 3.845V,400mW		
R 1	MF,(RS1FB330Ω J)	330Ω,±5%,1W		
R 2	MF,(RN14K2E2492D)	24.9kΩ,±0.5%,1/4W		
R 3	CF,(ARD25T334J)	330kΩ,±5%,1/4W		
R 4	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 5	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 6	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 7	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 8	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 9	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 10	Var,MF,(RJ-6P 5KΩ)	5.0kΩ,1/2W		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: POWER SUPPLY-2 (A10, MW920A)

CKT REF	DESCRIPTION	RATING		NOTE
R 11	MF,(RS2FB680Ω J)	680Ω,±5%,2W		
R 12	MF,(RN14K2E2492D)	24.9kΩ,±0.5%,1/4W		
R 13	CF,(ARD25T474J)	470kΩ,±5%,1/4W		
R 14	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 15	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 16	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 17	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 18	CF,(ARD25T203J)	20kΩ,±5%,1/4W		
R 19	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 20	Var,MF,(RJ-6P 5KΩ)	5.0kΩ,1/2W		
R 21	MF,(RS2FB150Ω J)	150Ω,±5%,2W		
R 22	MF,(RN14K2E2492D)	24.9kΩ,±0.5%,1/4W		
R 23	CF,(ARD25T224J)	220kΩ,±5%,1/4W		
R 24	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 25	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 26	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 27	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 28	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 29	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 30	Var,MF,(RJ-6P 5KΩ)	5.0kΩ,1/2W		
R 31	Not assigned			
R 32	Not assigned			
R 33	Not assigned			
R 34	Not assigned			
R 35	Not assigned			
R 36	Not assigned			
R 37	Not assigned			
R 38	Not assigned			
R 39	Not assigned			
R 40	Not assigned			
R 41	MF,(RN14K2E2492D)	24.9kΩ,±0.5%,1/4W		
R 42	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 43	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 44	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 45	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 46	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 47	CF,(ARD25T203J)	20kΩ,±5%,1/4W		
R 48	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 49	Var,MF,(RJ-6P 5KΩ)	5.0kΩ,1/2W		
R 50	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 51	CF,(AKD25T472J)	4.7kΩ,±5%,1/4W		
R 52	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R 53	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R 54	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 55	Var,MF,(RJ-6P 2KΩ)	2.0kΩ,1/2W		
R 56	CF,(ARD25T271J)	270Ω,±5%,1/4W		

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